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LAKE CARRIERS' ASSOCIATION.

To consider and take action upon all general questions relating to the navigation and carrying business of the Great Lakes, maintain necessary shipping offices and in general to protect the common interest of Lake Carriers, and improve the character of the service rendered to the public.

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CARRYING STEAM A LONG DISTANCE.

At the recent (New York) annual meeting of the American Society of Mechanical Engineers, Eckley B. Coxe spoke upon a method he had used in carrying steam a long distance. At a colliery they wished to carry steam to a waterworks about 4,500 feet over a hill from the boiler plant. A trough was made by nailing the edges of two boards together so that they formed a right angle. The trough was supported by two stakes driven in the ground and crossing just beneath the trough. The pipe was laid in the trough resting on cast-iron plates, the pipe surrounded by mineral wool, and a similar inverted trough placed over the top. To allow expansion a bend was made to one side at the top of the hill, and then it was turned back to its original direction. A large receiver was introduced in the pipe at the pumps. This was made of three sheets of an old boiler and was 34 inches in diameter. This also served as a separator. As the elevation was 1,800 feet above the sea, the cold was excessive in the winter time, but this arrangement had been in use since 1877, had cost nothing for maintainance and had given no trouble. Mr. Coxe believed that the secret in carrying steam long distances to an engine without causing a drop in the steam pressure was in the use of a receiver or reservoir.

THE DEEPEST MINE IN THE WORLD.

The United States has now the deepest metal mine in the world. For some time the claim has been made for the Maria shaft at the mines of Przibram in Austria, which was 3,675 feet below the surface at the time of the great fire in 1892. It has now been surpassed in depth by the No. 2 shaft of the Tamarack Copper Mining Co. in Michigan, which on December 1st was 6,340 feet deep and is now more than 3,700 feet, the average rate of sinking being about 75 feet a month. This makes it beyond question the deepest metal mine in existence, and only one other shaft has reached a greater depth, that of a coal mine in Belgium, for which 3,900 feet are claimed. Not only has it been sunk to a greater depth than any before it; but it has been sunk with much greater rapidity and at a less cost than probably any European shaft of anything like its depth or in ground as hard.

THE NAMING OF VESSELS.

It is only through continued agitation that reforms are accomplished. And it is to be hoped that as the result of frequent iteration that in time something may be done toward restraining vessel owners generally from duplicating in their own craft the names of vessels already afloat. This has been carried on in the past to the extent that it has now become almost an evil. The annoyance caused by the difficulty in identifying vessels of the same name is often very great. It causes much confusion in compilation of shipping news but is also a fruitful source of errors in reporting the movements of vessels. Instances are numerous in which the shipowner has been in doubt as to whether his vessel or some other one is meant by the report. And this has sometimes happened at a most critical time, when prompt action was necessary and yet much delayed because of the existing uncertainty respecting it. If this is liable to occur in the case of the shipowner, how much more extended must be the annoyance to the charterer, the underwriter and others that have to do with shipping matters.

A reform in this matter can come none too soon for the good of all concerned. No two vessels afloat should be allowed by law to bear the same name. This abuse is to be noticed more particularly with sailing vessels. But we have observed of late a tendency to repetition in the names of steamers. This, if continued, will still further complicate matters and the confusion arising therefrom will be increased rather than diminished because of the quicker movements of the latter. To institute a reform in this matter is within the province of every maritime nation. And a good example might be set in respect of it by our own Government, particularly now in the early stages of the revival of our merchant marine. It is to be hoped that some influence may be exerted that will result before long in this much to be desired reform.—*Maritime Register.*

BLOWING UP DERELICTS.

The dynamite cruiser Vesuvius has started from the Brooklyn Navy-yard on an expedition for the destruction of wrecks, derelicts and obstructions to navigation caused by wrecks. This vessel has been engaged in the same employment before, although her officers claim that she is not constructed for it, being too sharp at the bow and unable to operate in blowing up wrecks except in calm weather. She is supplied with three dynamite guns, and is the only vessel of the kind in the Navy.

Although the Vesuvius is a dynamite cruiser, her peculiar armament will not come into play in her wreck-hunting expedition. According to Lieut. W. B. Caperton, the navigator of the vessel, finding the wrecks is usually the hardest part of the work the hunters are called upon to do. The latitude and longitude are given on the hydrographic chart, and then it requires a good deal of searching before the exact location can be ascertained. Torpedoes loaded with gun cotton are used in blowing up the obstructions, and this method is generally very effective. These torpedos consist of a cast-iron shell, cylindrical in form, three feet long and about a foot in diameter. There are handles on the sides and from the head projects an iron tube into which an electric wire passes. The tube is fitted with a plug to keep the water out, and the wire then goes through a papier mache cylinder nearly to the nether end of the torpedo, where it is connected with a very thin platinum wire, and this connects directly with the gun cotton, which is the explosive used.

When the sunken wreck is found with the masts sticking out of the water, one of these torpedoes is let down to the deck, but secured to the mast. Then the officer with a crew of men withdraw to a distance of 150 to 200 feet. The officer in command pays out the wire from a reel which he holds in his hand, and when the proper distance is reached he connects one end of the wire with a hand dynamo. The electric current is instantly sent into the torpedo and the explosion is instantaneous. Often when such explosions are made the wooden masts are shot up into the air for a great distance, and in descending they separate into a thousand pieces, having been completely shattered by the force of the explosion. In attaching the torpedo to any object to be exploded, care has to be taken that it comes directly in contact with the object, for if any considerable amount of water is allowed to intervene, it acts as a cushion and a great deal of the force of the explosion will be lost. When sunken hulls are found soundings are make and, if it appears that they are not covered with a sufficient depth of water to render then free from danger, torpedoes are let down with guide ropes and the obstructions are blown to atoms. Some hulls are so situated that they can be clambered upon and holes bored into their sides in which the torpedo can be placed, and then the destruction is very complete, though a second explosion is sometimes necessary. The work of placing the torpedo in position has to be done entirely in small boats and cannot be accomplished except in smooth weather, and this, of course, greatly restricts operations, especially during the winter season.

The floating derelict is by all odds the greatest menace to navigation. These are generally lumber laden vessels which have been abandoned, and which remain afloat for a long time and generally beneath the surface, thus making it extremely difficult to see them. So serious has this matter become that Congress at its last special session passed a bill providing for the removal of floating derelicts and stationary wrecks, and to this work the Vesuvius has just been assigned. A number of these abandoned vessels have made most remarkable voyages with no hand to guide them, influenced mainly by the Atlantic currents.

NEWS AROUND THE LAKES.

CHICAGO, ILL.

Special Correspondence to The Marine Record.

The steamer Oregon has been chartered for corn to Buffalo at 3 cents.

The new fish tug built by the Grand Haven Shipbuilding Co. for northern Lake Michigan parties was launched last week.

Capt. H. W. Blend, formerly of the steam barge Roanoke, will have command of the steam barge Annie Laura next season, vice Capt. James Carr resigned.

It is reported that the tug J. C. Perrett will tow, between Menominee and Buffalo, the coming season, the barges of the Stephenson Transportation Co. The tug Boscobel, which has heretofore towed for the Peshtigo Co., will take the Perrett's old route between Menominee and Chicago.

Edward Lynn, as agent for the Chicago Independent Tug Line, has been east offering parties at Detroit to contract for the season of 1894 to do their towing of steamers and consorts at 60 per cent. off the regular towing tariff rates at this port. The owners of the Adams fleet were among those who received that offer.

Dunham's tugs towed the schooner George H. Warmington to Armour's elevator on Goose Island Tuesday to load. V. O. T. tugs towed the steamer Oregon to the Indiana elevator and the schooner Golden Age to the Santa Fe elevator Sunday, and the schooner Charles Foster to the Illinois Central elevator Tuesday, to load. The Chicago Towing Co.'s tugs towed the steamer Micosta Friday to the Illinois Central elevator to load. I. T. Line tugs towed the steamers Elfinmere and Aztec to the Armour E. elevator Sunday to load.

Cook, Calbick & Co. chartered the steamer Robert Holland and consorts Fanny Neil and Stephenson Friday for corn to Ogdensburg at 4 cents, free of canal tolls. Carr & Blair chartered the schooner Mary Woolson for corn to Buffalo at 3 cents, and the steamer D. C. Whitney and schooner Wayne for corn to Ogdensburg at 4 cents, free of canal tolls. Capt. John Prindiville chartered the schooner George H. Warmington for corn to Kingston at 4 cents, free of canal tolls. Elphicke & Co. chartered the schooner C. P. Minch for 30,000 bushels of corn to Port Huron at 2¼ cents.

The Vessel Owners and Masters' Association will hold a special meeting at the hall of the Ship Masters' Association, No. 2 Market street, on Friday, February 16th, at 1:30 p. m. As the matters to be discussed are of vital importance to those interested in vessel property, all steam and sail vessel owners and masters are requested to attend. At a meeting of the association held Wednesday afternoon it was unanimously resolved that all members of the association shall ship their seamen through the Lake Carriers' Association shipping office. It was also unanimously resolved to use every endeavor to make radical changes as to loading, unloading and towing rates. The following rates for loading and unloading were adopted:

1 inch and piece stuff (dry) per M	$ .18
1 inch and piece stuff (green) per M	.18
Pickets, shingles and lath, per M	.18
1 inch hemlock (dry) per M	.20
2 to 3 inch hemlock (green) per M	.25
Timber 8x8 up, per M	.25
HARDWOOD LUMBER.	
1 to 2 inch, per M	.25
3 to 4 inch, per M	.28
Dry elm and basswood, per M	.20
CEDAR.	
Ties, per thousand	9.00
Posts, " "	5.00
Hemlock ties (piece)	.015
TELEGRAPH POLES.	
25 feet 30 poles (each)	.025
35 to 40 feet (each)	.04
WOOD.	
Wood, per cord	.25
Slabs, per cord	.20
Tanbark, per cord	.20

Loading 30 cents per hour.

Committees were appointed to wait on the lumber merchants and urge them to assist the association in maintaining the above schedule of rates, and on the tug companies to urge them to make the towing rates for the season of 1894 40 per cent. off last seasons towing tariff rates. At the meeting next Friday the several committees will report the results of their efforts with the lumber merchants and tug companies.

ASHTABULA, O.

Special Correspondence to The Marine Record.

The flood has taken the ice gorge out of the mouth of the river.

It is the general report that the vessel owners will ask the ore shovelers to accept a reduction for unloading ore of from ten cents to eight cents per ton at the opening of the coming season. The ore shovelers here have been expecting a cut, since the price on everything has dropped, but they have at no time thought they would be asked to accept less than nine cents. Whether they will accept eight cents or not remains to be seen.

Ore shipments to the furnaces have been so light during the fall and winter that unless a grand change takes place in the early spring months the season of navigation will open with more ore on the docks here than there was a year ago. This will be true with every dock at the Harbor, with perhaps the exception of the Angeline docks. Shipments from this dock have been steady and if continued the beginning of navigation will find but few tons of ore left.

DULUTH, MINN.

Special Correspondence to The Marine Record.

The coal receiving business of the head of Lake Superior has amounted to 2,122,781 tons for the past year, as against 1,812,561 tons in 1892; 1,750,000 in 1891, and less than 600,000 tons in any year prior to 1886. Coal receipts for the past two years by grades are as follows:

	1892.	1893.
Bituminous	1,211,014	1,550,866
Coking	70,000	.....
Anthracite	531,574	571,915
	1,812,561	2,122,781

Figures of receipts by companies are almost impossible to secure, and can only be estimated, but the estimates given here are carefully made and substantially verified, and are as nearly accurate as possible:

	Bituminous.	Anthracite.
Northwestern Fuel Co	535,000	140,000
Ohio Coal Co	310,000	100,000
Pioneer Fuel Co	170,000	135,000
Youghiogheny & Lehigh	150,000	35,000
St. Paul & Western	130,000	30,000
Philadelphia & Reading	100,000	70,000
Pennsylvania & Ohio	75,000	30,000
Lehigh Coal Co	80,000	30,000

The Board of Trade building, on the corner of Superior street and Third avenue, was destroyed by fire Sunday afternoon, causing a total loss of over $120,000 with insurance aggregating $80,000. In addition to the Board of Trade, the following firms and individual had offices in the building: Lake Superior Elevator Co., Walter Van Brunt, C. H. Graves & Co., Western Union Telegraph Co., Union Improvement and Elevator Co., Cutler & Gilbert, North America Telegraph Co., Van Duzen, Harrington & Co., American Steel Barge Co., Rose & Lazier, C. A. & E. D. Field, H. B. Earhart & Co., Thomas Gibson, Lasalle & Wolvin, Western Transit Co., J. N. McKindley & Co., L. T. Sowle & Co., Imperial Mill Co., Ames, Brooks & Co., O. C. Hartman & Co., A. D. Thomson & Co., Duluth Elevator Co., McCarthy Bros., T. S. Linton & Co., G. H. Cook, Turle & Co., Franklin Payne & Co., and Owen Ferguson. Hardly anything was saved. Work on a new building for the Board of Trade will begin at once.

KINGSTON, ONT.

Special Correspondence to The Marine Record.

The Montreal Transportation Co's. barge is about completed. She is a sister ship to the Winnipeg, and will be put on the upper lakes next season, to be towed by the Glengarry.

Capt. J. Dix will sail the schooner Dunn again next season. The vessel has enough work ahead to keep her going all the summer. She will carry timber from Toledo to Garden Island.

Capt. James Fleming and Steve Tyo, mate, who had charge of the schooner Glenora in 1892, when the vessel was driven ashore on Lake Superior, in the neighborhood of Michipicoten, will be presented with handsome medals Saturday, for brave conduct. Three insurance companies are interested in the medals. It was on this trip that Capt. Fleming was obliged to walk across country, fifty or sixty miles, to reach a telegraph station. He was obliged to lie on the ground in snow wrapped in a blanket. The presents are given by the companies to encourage sailors to use all efforts to save vessels.

MARINE CITY.

Special Correspondence to The Marine Record.

Capt. Thomas Currie will sail the Huron City the coming season.

Capt. Zealand has been engaged to sail the Simon Langell during next season.

W. J. Harrow and A. W. Selkirk have sold the tug Harrow to Cleveland parties for $9,500.

Upon the opening of spring Capt. McArthur will go to Chicago to again take command of the steamer Christopher Columbus. The boat will run in the excursion business.

Capt. Eber McQueen, who has been connected with the Hawgood & Avery Transportation Co., of Cleveland, the past seven years, will sail a Minnesota liner the coming season.

CLEVELAND, O.

Special Correspondence to The Marine Record.

Capt. George Robarge will sail the steamer S. S. Curry next season.

The masters of the Minch fleet have all been reappointed for another season.

Mr. John Gordon, general manager of the Northern Steamship Co., was in the city Wednesday, looking over the new passenger steamers.

The United States Standard Underwriters' Association have given to the new deep draft steamer now building at the Globe shipyard the highest class for twenty-five years, upon examination of the drawings and specifications.

Among the lake marine men who have been in Cleveland this week are J. G. Gillespie, general manager of the P. & T. Dredging and Lighterage Co., of Toledo; U. Grant Grummond and W. A. Avery, of Detroit, and B. B. Inman, of Duluth.

Morgan, Moore & Baine have sold 150,000 tons of coal to the Grand Trunk, and Osborne, Salger & Co. a like amount. Evan Morris, of Youngstown, sold 50,000 tons. The Detroit and Sarnia supply of 70,000 tons went to the Ohio Coal Co., of Cambridge, O.

The directors of the Cleveland & Buffalo Transit Co. met last Monday and elected all their shore officers for another year, except Mr. John C. Fitzpatrick, who resigned his position as general agent for the company at Buffalo. He will be succeeded by H. S. Fisher, now general agent at Cleveland, whose place in Cleveland will not be filled for a time.

Mr. U. Grant Grummond, manager of the Grummond Tug Line, was in Cleveland last week. The tug line will, under his management, do wrecking in both American and Canadian waters. A branch office has been established at Port Huron. Mrs. S. B. Grummond will continue the business of her husband, the late Capt. Grummond. The Mackinac line of steamboats will be managed by S. B. Grummond, Jr. The steamer State of Michigan will run from Cleveland to Mackinaw, the Flora from Toledo to Mackinaw.

The Chase Machine Co. have completed two condenser pumps, one for the steamer Chauncy Hurlbut, and one for the Clyde Iron Co., at Duluth. The dimensions of the former, which will be shipped to-day, are 8 by 12 by 10, and of the latter 8 by 10 by 10. The company has also finished a pneumatic hammer for the Fleming Manufacturing Co., at Fort Wayne, Ind. It is a new design of the Yeakley-Robertson patent, and gave the highest satisfaction at a test given Wednesday. The blows are said to be twice as powerful as those of a steam hammer of the same weight of head, and the hammer runs at a high rate of speed.

COLLINGWOOD, ONT.

Special Correspondence to The Marine Record.

Watts & Sons are building three new lifeboats for the steamer City of Midland.

Work on the C. P. R. steamers will begin about March 1.

The tug Charlton will practically be new from keel to mast-head when she leaves the dry dock this spring.

It is said that the government has decided to spend some money on the cruiser Bayfield this spring.

The tug Ann Long will come down from Little Current on the opening of navigation, for repairs.

The tug Maud S is receiving a new boiler 5x7 feet, of the Fitzgibbon pattern. It will supply steam for a new fore-and-aft compound engine, with cylinders 8 and 16 inches in diameter by 10 inches stroke. The work is being done by Doty Bros., of Toronto.

The Collingwood Dry Dock and Ship Building Yards are by far the most important on the Canadian shores of the Great Northern Lakes. This winter there has not been a single day of idleness, all the time being fully occupied. The immense amount of work contracted for by the company has given employment to many of our citizens. Last week the company contracted with the Messrs. Noble to build one of the longest tugs out of this harbor. The tug will be 110 feet over all in length, 20 feet beam, with a depth of 9 feet. The boiler, which will be of the Scotch type, will be 9 feet and 6 inches in diameter and 11 feet and 6 inches in length. The furnaces, of which there will be two, will be 4 by 6 feet. The engine, for which Messrs. Doty Bros., of Toronto, have the contract, will be a steeple compound having cylinders with diameters of 15 and 26 inches with a stroke of 22 inches. It is calculated that with 110 pounds of steam, which pressure the boiler will carry, the tug will handily make 13 miles an hour. The boat will be ready to go into commission about the first of May.

Why is a newspaper like a pretty girl? To be perfect it must be the embodiment of many types; its form is made up; it is chased, though inclined to be giddy; it enjoys a good press, the more rapid the better; has a weakness for gossip; talks a good deal; can stand some praise, and it is awful proud of a new dress. It cannot be kept in good humor without cash.—*Ex.*

NOTES FROM ALL PORTS.

E. M. Peck is now president of the Swain Wrecking Company.

No route has yet been selected for the side-wheel steamer City of Toledo for next season.

Sullivan & Hubbard, the Toledo tug men, have separated their interests.

The steamers John Pridgeon, Jr., and B. W. Blanchard have dropped out of the Clover Leaf Line.

The Michigan Central & Canada Southern contemplates building a branch line to Amherstburg.

Citizens of Hammond, Ind., are urging the improvement of the Calumet river to the extent of creating a harbor for lake vessels.

At the Davidson shipyard, in Bay City, three big wooden steamers and an equally large schooner are on the stocks. Work on these four vessels is, however, progressing very slowly.

The Erie & Pittsburg Railroad Co. are surpassing all former records of their road in the shipment of iron ore. At present they are running about 75 carloads of ore per day, which is an excellent showing for this season of the year.

The tug Carrie Martin, owned by John Averill, of Cleveland, is being rebuilt by Burdette Parsons, at Vermillion. She will be enlarged somewhat and rebuilt from stem to stern and put into the fishing trade in the spring. It is designed to use her old machinery if possible.

The Bucyrus Steam Shovel & Dredge Co,, of South Milwaukee, Wis., recently sold two steam shovels to the Heidereich Co., of Chicago, for use on the great drainage canal now building, by which it is expected to divert the drainage of the city of Chicago away from Lake Michigan, the source of its water supply.

The following appointments of vessel masters have been made for the season of 1894; steamer C. H. Green, Capt. John Gary; steamer Oscoda, Capt. George W. Ryan; schooner Our Son, Capt. Wm. A. Edgar; schooner C. G. King, Capt. Peter Edgar; schooner Ida Corning, Capt. Peter H. Edgar; schooner Genoa, Capt. D. C. Ryan; schooner Keating, Capt. Patrick Ryan.

It is reported that the tug Perrett will tow between Menominee and Buffalo next year, using the barges of the Stephenson Transportation Co. The big Boscobel, which has always towed for the Peshtigo Co., will take up the Perrett's old route between Menominee and Chicago. There is more lumber than ever going east from the former city next season.

A new route down the St. Lawrence river from Buffalo without the aid of a railroad is projected for the coming season. It is proposed to run the Richelieu Line steamer Columbian between Buffalo and Chippewa and then convey passengers by trolley to Queenstown, where they will be met by the regular Richelieu boat for Toronto and the St. Lawrence. The Columbian is an almost new boat of good size, being about 150 feet long. She was built by the Harlan and Hollingsworth Co., of Wilmington, Del., for the St. Lawrence river service.

The Hurontario Ship Canal & Power Co. is asking the Ontario legislature for papers of incorporation. This company proposes to build a waterway between Georgian Bay, opening into Lake Huron and Lake Ontario, capable of passing the largest lake steamers. The capital stock is placed at $55,000,000, and the company pledges itself to spend $1,000,000 within the next eighteen months, and $5,000,000 in five years, and to complete the canal within ten years. The fall between Georgian Bay and Lake Ontario is 200 feet, which must be overcome by locks. This route would entirely cut out Lake Erie and the difficult navigation by way of the St. Clair river, Lake St. Clair and the Detroit river into Lake Erie. The trouble will be to find the $65,000,000.

Some time ago M. J. Haney, the manager of construction on the Canadian Sault canal, was summoned before a magistrate for allowing work on the Sabbath. Mr. Haney deemed that it was work of necessity, but nevertheless Mr. Haney was mulcted in fine and costs. A break in the water-power canal occurred a week ago Sunday morning, and Mr. Londry found it desirable, in his capacity as director of the work, to appeal to Mr. Haney for assistance. That gentleman promptly placed twenty teams at his disposal and they worked all day. It is not stated whether any of the local "unco' guid" intend to prosecute, but as the Ontario government declines to pay any of the expense of such prosecutions, probably nothing will be done. Mr. Haney decidedly has the best of the situation.

The MARINE RECORD published at Cleveland, recently issued an elegant photo gravure supplement showing views of nine steamers and representing an equal number of shipyards. Views of the following steamers are shown on the supplement: Christopher Columbus, Manitou, City of Toledo, Merchant, North West, City of Alpena, Centurion and Alva. The picture is 16x22 inches in size and is suitable for framing.—*Kewaunee Enterprise.*

SEVERE WINTER GALES.

Monday was a day of heavy gales in both America anp Europe. On the Atlantic and in the English Channel several shipwrecks occurred and the winter provided the only reason that the lakes did not suffer most severely. The storm has kept up at a more or less furious rate ever since.

A special dispatch from Grand Haven says: The steamer Roanoke, of the Grand Haven & Milwaukee Transportation Co., arrived Tuesday morning, after being out for twenty-nine hours in the terrific northern gale. She was covered with ice about a foot thick, and was stove in forward from the force of the sea. She had a crew of fourteen and a list of eighteen badly frightened passengers, most of whom were dreadfully sick throughout the trip.

At Milwawkee on Tuesday night, Contractor Murphy and four men who were working on the waterworks crib had a narrow escape from being carried out into the lake and to almost certain death. They had started from shore for the crib with a quantity of supplies, and were on their way back when the yawl became fast in the ice, and was being carried in the ice field with an offshore wind. The new fire boat Foley was ordered out, and overtaking the yawl off North Point about 9 o'clock in the evening, picked up the men and landed them at the crib.

At Chicago, Monday, three men at the water works crib, four miles out in the lake, were brought face to face with death, The landing platform was smashed by the waves, which dashed over the crib structure and drenched the imprisoned men. The telephone in the building was working, and the men said that the building was being shaken frightfully by the sea. No life boot could get out to them in the storm, and no effort to rescue the men could be made that day.

ENGLAND'S MARINE.

Patriotic Englishmen are alarmed about their ships. Neither in number nor technical perfection, it is claimed, do they equal what was believed of them. If cruisers are wanted they are not cruisers, their plating is far from perfection, their armament is deficient. In a storm last week the Resolution rolled so that old sailors were waiting and watching to see her go down into Davy Jones' locker. Long ago, Lechner, the German marine technician, demonstrated that England's ships, especially her new ones, would never come up to expectations. At the same time he claimed for German ships ability to stand tests severer than those made in England. The 450,000,000 marks paid by England for 70 men-of-war has not been a most profitable investment. It is claimed that in no part or point of construction do they answer demands. German ships built for 15 knots and 8,000 horse-power were turned out at 9,500 horse-power and 15.5 knots. Of this the Germans are naturally very proud.

Their writers, pleased with these results, point to the fact that Germany is poor in means to attract distinguished technicians to her arsenals, ship-yards, etc., while England has had at her disposal illimitable wealth. To illustrate: The chief constructor in England's marine gets 41,000 marks ($10,000) yearly, Germany's 10,000 marks or $2,500; the director of one of England's technical marine wharves 15,000 marks, one such in Germany 7,300 marks. That Germany's technicians turn out better results is proof positive of a better, more suitable, fundamental, technical training, and of honest, ambitious, faithful work.

How does Germany do this? How is it she is constantly achieving such results, not only in her marine, but in her machine shops of every kind? How is it that she can so soon make herself independent of England and the United States in the matter of all kinds of machinery? By the "suitable, fundamental, technical," "zweckmasig und grundlichen" training obtained in her Industrial, Industrial Art and Technical schools. Give us such schools and we can laugh at opposition.—J. G. MONAGHAN in *American Machinist*, (written from Chemnitz, Germany.)

OIL AS FUEL.

Oil as fuel has been successfully used in a trip of the Baku Standard, an oil tank steamer belonging to Messrs. Alfred Smart & Co., of London. The vessel was fitted at Messrs. Armstrong's yard, Newcastle, with a new apparatus specially constructed for the consumption of oil instead of coal. On her trip round from Sunderland to Dartmouth the arrangement answered admirably, the results being beyond expectations. Whilst her consumption of coal averaged 30 to 32 tons daily, only 15 tons of oil does the same work, while her staff of firemen is reduced from ten to six. No difficulty is experienced in getting steam, and there is an absence of dirt or smoke. The oil is non-explosive, the benzine having been previously extracted. The Baku Standard is about 3,000 tons register.

FLOTSAM, JETSAM AND LAGAN.

The reorganization committee of the Nicarauga Canal Construction Co. announces that about 75,000 shares have assented to the agreement.

John F. Ryan, a San Francisco diver, has found the wreck of the steamer Brother Jonathan, which was lost July 3, 1865, about ten miles west of Frisco. There was it is said, $1,000,000 in treasure on board, and Ryan is making ready an expedition for its recovery. One hundred and forty-seven lives were lost in this wreck.

Capt. James Gault, of Pittsburg, Pa., who had charge of the first steamboat navigating the Monongahela river, died Tuesday, Feb. 6th, at Point Breeze, at the home of his son, Thomas Gault. He had been in declining health for several years suffering with a complication of ailments. He was 79 years old and was well known along the Ohio and Monongahela rivers.

Germany's naval experts have decided that the best color to paint their cruisers and torpedo boats, in order to make them as difficult of observation as possible, is a kind of dirty buff. They recommend that the whole of the vessel should be uniformly coated with this color, and that nothing on their decks or upper works should contrast with it.

More dividends of the foreign Marine Insurance Companies have been announced. The London and Provincial will pay at the rate of 10 per cent.; the Thames and Mersey a balance dividend of 2s. and a bonus of 4s. per share, making 10s. per share for the year; the Merchants Marine a dividend of 6 per cent. for the year; and the Union Marine a dividend of 7s. 6d. per share, 3s. 6d. per share of which has already been paid on account' £18,131 being transferred to the reserve fund.

An interesting experiment with shingles was tried a short time ago, says a writer in an English journal. A green 6 inch cedar shingle, fresh from the saw, was measured and weighed, care being taken to get both exact. It was found that it weighed 7 oz. It was then dried and again weighed and measured. It had shrunk nearly ⅓ inch, while the weight had decreased from 7 oz. to 3 oz. It was then submerged in water 24 hours, and the size had not changed a particle, while the weight had increased 1 oz., demonstrating the superiority of cedar shingles over others, as when once dry they will neither shrink with excessive heat nor pry one another off the roof in wet weather.

The new White Star steamer Civic, the largest and most powerful freighter afloat, has arrived at New York from Liverpool. The Civic was designed especially for the freight and cattle trade, and in her construction are combined all the latest and most approved devices for safety and economy. She is 500 feet in length, 60 feet in breadth and has a depth of hold of 38 feet. Her registered tonnage is 8,315 gross, and her holds have a total capacity of 14,089 tons. She is fitted on deck for 800 head of cattle and 20 horses, the stalls of the latter being amidships. Her engines are of the triple-expansion type, working twin screws of manganese bronze, and are fitted with improvements, which have hitherto been confined to passenger vessels.

Forest and Stream speaks of a curious find in the Cape Ann fish market, at Gloucester, Mass. It was nothing less than a mackerel with a rubber band around its body. The band had been put on the fish when quite small, and stayed there in spite of the rapid growth of the wearer. The fish's body under the band did not grow, which caused a depression in the full-grown body of about three inches in depth. The depression was covered with a healthy skin in no way unlike that on the rest of the body. The fish measured in length fourteen inches, diameter of body each side of the depression, seven and three-fourths inches, diameter of depression, five inches. The fish was undoubtedly in a healthy condition, and the band was sound and could be stretched like any other band.

The old wooden ships of the Navy are gradually being retired from active service. The flagship Lancaster is now on her last cruise. When relieved by the Baltimore she will return to New York and be transformed into a receiving ship, to take the place of either the Minnesota or Vermont, which are both in a state of decay. Another ship that will soon follow the Lancaster to the graveyard of all old naval vessels is the Alliance, now at San Jose. She will leave in the next few weeks for New York, and is also to serve as a receiving ship. The Marion, Mohican, Adams and Yantic are still in service, but their days are numbered. The Yantic is in the South Atlantic, and will return home shortly to be placed out of commission. She is now on her last cruise. The Adams is not good for many more months, and the Marion is little better. There will be two wooden vessels in the Navy for many years, however, as, by special act of Congress, the Hartford and the Kearsarge are exempted from the repair limit of 10 per cent., and will thus be saved. The Hartford is being rebuilt, and will prove a good vessel for many years, but with the exception of this every wooden ship in the Navy will disappear within the next two years.—*Washington Star.*

MARITIME LAW.

SHERBORNE v. THE N. & W. NO. 4 and BOSTON TOWBOAT CO.

District Court, S. D. New York. October 8, 1893.

1. SHIPPING—ANCHORED VESSEL—DANGER OF DRIFTING—DUTY. When there are known indications of danger of drifting of an anchored vessel from any extraordinary cause, whether ice, storm or position, ordinary prudence requires more than one anchor to be let go, and the omission of this precaution is at the vessel's risk.

2. COLLISION—ANCHORED VESSEL—HARMLESS CONTACT—ANTICIPATION OF LATER INJURY—NECESSITY OF CHANGING POSITION. When two barges drifted in the ice alongside a steamship, and remained there two or three hours, and until the change of the tide, when, in swinging, the ship was injured, but during the interval before the turn of the tide the ship had made no attempt to extricate herself from her dangerous position, as she might have done, Held, that the ship was partly liable for the damage.

3. SAME—THREE VESSELS IN FAULT—DIVISION OF DAMAGES. Where two barges, entangled, and practically one mass, drifted upon an anchored vessel, which made no effort to avoid the damage which subsequently was sustained by her, Held, that the anchored vessel should pay one-half the damage, and the other half should be divided between the two barges.

In Admiralty. Libel for collision. Decree for divided damages.

Brown, District Judge. The primary cause of the damage to the libelant's steamer Anerly was the drifting of the two barges in the ice on the night of February 22d, whereby the two came alongside the Anerly. No immediate damage was done. The damage arose afterwards, upon the change of tide from flood to ebb, when the relation of the three became somewhat complicated upon swinging to the southward, and the Anerly had a plate stove in before the vessels got clear. I am satisfied that the two barges, after they got alongside the Anerly, made all reasonable efforts on their part, and did as well as they could, to get clear and to avoid any subsequent damage. If their original drifting upon the Anerly was without any fault on their part, the libel should be dismissed.

The case differs, however, from others that are cited on behalf of the respondents, in that both defendant vessels had ample notice of the presence of an unusual quantity of ice in the bay, and of the consequent necessity of taking special precautions against the liability to be carried away by the ice, to say nothing about the place of anchoring, nearly in line with each other and with the Anerly. Both barges had two anchors. Neither put out more than a single anchor—except that the Merryman, a few minutes before she began to drag, when it was too late, dropped her second anchor, and soon drifted upon the N. & W. No. 4, which did not drop her second anchor at all. To put out both anchors would have been but an ordinary precaution under the circumstances shown in the evidence. The danger from ice was not sudden or unexpected, but, as I have said, had been long evident.

The neglect of reasonable precautions is not to be justified by citing instances of the negligence of other vessels. I do not find any case in which, under analogous circumstances, such accidents have been adjudged inevitable. On the contrary, where there are known indications of the danger of drifting from any extraordinary causes, whether from ice, storm or position, ordinary prudence requires that both anchors be let go; and the omission of this precaution is held to be at the vessel's risk.

It is further urged that the volume of ice was so great that two anchors would have made no difference. Very clear proof would be required to sustain a defense of that kind in behalf of those whose negligence is proved. In the present case there is nothing amounting to proof at all, but only certain opinions of persons interested. On the other hand, the fact that the ice parted not long after the two barges drifted alongside the Anerly, and the uncertainty whether the steamer, though having out but a single anchor, drifted at all, show, as it seems to me, that this defense is mere speculation. I must, therefore, hold both barges in fault for getting into a false position alongside the Anerly, which was the original cause of the subsequent damage.

But I think the Anerly is also to blame for not taking means which were easily within her power, and which might safely have been employed, to avoid the subsequent damage. That there was danger to be apprehended from the swinging of the vessels to the southward on the change of tide from flood to ebb, is manifest. The barges were alive to this danger. The Anerly seems to have shown entire indifference to the result. There was an interval of between two and three hours during which the Anerly might have been removed out of the way or have slipped her cable. Her inaction would almost seem to justify the hypothesis that she supposed the barges alone were likely to suffer damage, and that she would leave them to get out of it as they could. The situation, however, plainly involved danger to them all, and it was the duty of the Anerly as much as of the barges to do what was easily within her power during the considerable interval that elapsed before the change of tide to avert the danger.

MANCHESTER CANAL DRAWBACKS.

Manchester people cannot congratulate themselves on the first three weeks' navigation of the canal. Whilst it is true that vessels have, by dint of much labor on the part of their pilots, and those who have to do with the practical work of assisting them through the canal, arrived at Cottonopolis, the tale of mishap and damage to hulls and masts is a woeful one, both to underwriters and shipowners. Hardly a vessel of any size has attempted the passage without either damaging her plates or else inflicting some damage on the banks of the canal or pierheads of one or other of the locks. Even the most sanguine admirers of the canal are beginning to recognize the fact that its efficiency as to width, to allow two vessels to pass, is not sufficient for practical purposes. They now see that lay-byes are absolutely necessary. Even with two tugs, one ahead and the other astern, the steering is both dangerous and difficult of accomplishment, and with a side wind blowing of any force it seems almost impossible for a fairly large steamer to traverse the canal in safety. What will the shareholders say to construction of these lay-byes, involving, as it would do, the expenditure of an enormous amount of money?—*London Transport.*

AN OBNOXIOUS ORDER.

Manufacturers of coil boilers are considerably wrought up over a ruling of the government board of supervising inspectors, which decides the conditions which shall be met by boilers for steamers. That board recently ruled that coil boilers with curved tubes must not be taxed beyond 175 pounds pressure. This ruling virtually bars the coil boilers from yachts and small craft, where it is desirable that the steam pressure shall be much greater than the limit set by the inspectors. In the torpedo boat Cushing, for example, the pressure used on the Thornycroft boiler, which is of the coil variety, is 250 pounds. The coil boiler makers, therefore, think the inspectors are imposing on them in insisting on conditions which the government experts of another department do not observe. Another feature to which the coil boiler people take exceptions is the requirement of the inspectors that these boilers shall in the test stand double the working pressure, while ordinary boilers are only required to stand one and a half the working pressure. Several of the coil boiler men are in Washington and will endeavor to convince the government inspectors that they are unjust in their rulings.

WANT MONEY FOR MICHIGAN RIVERS.

Congressman Linton, of Michigan, has asked for a government survey of the Flint and Shiawassee rivers, so far as the same can be made navigable with reasonable expense, and has been assured that his request will be granted.

It is asserted by those familiar with those streams, which traverse one of the most fertile sections of the state, that with a very moderate outlay, they can be made navigable for many miles from Saginaw with light draft boats, and as they are no longer monopolized for log rafting they can be navigated profitably and furnish an outlet for agricultural products, hoops, staves and other forest products and coal from the newly discovered fields south of Saginaw, which are now being developed.

If the government will make the necessary survey and improvement, which will consist chiefly of clearing the streams of obstructions, such as sunken logs and small sand bars, it is proposed to construct a number of stern-wheel steamers similar to those used on southern rivers to navigate those streams.

PRESERVE THE NAVY.

It is imperative that a ship's inner bottom shall not only be thoroughly clean but thoroughly dry when cemented and painted. Now the inner bottom of a ship afloat, owing to the water around her being almost invariably cooler than the air inside, is in a continual sweat of condensation, or, at the best, sufficieutly damp to prevent the adhesion of paint. Compartments may be painted and repainted quarter after quarter, only to find the same cloak of evil at the end of the next. If, then, any part of her first protective coat has been put on during a damp day when a ship is building, or any portion has not been painted at all until after she has been put afloat, the evil can never be fully remedied so long as she remains afloat and in commission.

Is it not thus clearly shown that to make a ship last her full period of lifetime she must be put out of commission at least after every three years' cruise, everything removed from her, even to the last lump of coal and the last rope-yarn, then to be docked, cleaned and dried out to the uttermost cellular space, and finally recemented and repainted inside, while still out of the water and on specially chosen extremely dry days?

Until now it has been utterly impossible to do this with the vessels of our infant navy. They have been required to perform double and triple duty all over the world. More than one of them has done duty on three different stations thousands of miles apart within half a year. The first of the new ships was commissioned in 1886. The Roach cruisers have been in commission more than six years. Half of the new ships have been cruising more than three years. The Navy Department is being compelled, in spite of the need of them on stations, to begin laying them up for repairs. The first one to go out of commission is the Atlanta, and her condition, due to seven years' unbroken cruising, has been found to be deplorable. The Boston and Chicago must soon follow. These can ill be spared, and others must wait much too long for similar relief. To maintain our peace navy alone we must have half as many ships again as we have now built and are building; we should have fifty ships. One-third of these could then be undergoing proper life-giving renovation while the other two-thirds were cruising. It is to tell the public this that this article is written. It is to make them understand that a dozen new ships out of commission would not be an evidence that we had more ships than we needed, but that our peace navy was in a healthy, self-supporting condition. The life of a steel ship subjected to such an ever-recurring cycle of thorough renovation will be greater than the remaining years of this journal's youngest reader.

We have told our representatives in Congress that we wanted a navy which would take away our shame as a maritime nation, and they have given it to us. Now let us convince them that we want that navy perpetuated by making it large enough to be self-supporting, even if we are reluctant to authorize its increase to a war footing. Otherwise our beautiful new ships must, like a man who leads a fast life, become old before their time, and fall to ruin when they should be in the prime of their existence.—*John M. Edicott, Ensign, U. S. N., in Harper's Weekly.*

WANTED—MORE MEN FOR THE NAVY.

In the February number of the *United Service*, a monthly review of military and naval affairs, published by L. R. Hamersly & Co., 1510 Chestnut street, Philadelphia, Pa., is a very instructive article on "American men for the American Navy," by F. M. Bennett, passed assistant engineer, U. S. N., who depicts the personnel of the Navy in its right light. The subject begins with the sinking of the U. S. steamer Ashuelot in the China Sea, about eleven years ago, carrying part of the crew down with her. The steamer had 111 enlisted men, exclusive of marines, and this small number of men represented no less than twenty different nationalities, only nineteen of the crew being native born Americans. Another similar instance is given of the Monocacy, a sister ship, that had 105 men in the crew, not counting officers and marines, hailing from twenty-one different countries. In fact the foreigners were in possession of most of the important ratings in the ship. What a deplorable state of affairs was that for a country like America, and the question arises is it any better today? We fear not. Mr. Bennett says:

"Our ships, engines and guns are thoroughly American, and it is high time that the crews were Americanized by so modifying present naval practices as to make life on a man-of-war possible and even attractive for our citizens. Theories must be laid aside and some practical method put in operation whereby an American youth can find in the navy of his country an opportunity for a career at least equal to that open to him in trade or in the mechanical arts. A great deal of ink has been consumed by naval officers and others during the last few years in discussing ways and means for bettering the condition of the enlisted men of the navy and making the service more attractive for them, but every scheme that has appeared in print, and they are many, falls absurdly short of the mark. The pay of some of the chief petty officers has recently been raised to fifty dollars per month, and, to judge from the sentiments expreseed by naval essayists, this sum is considered princely enough to attract the very best talent to the service, in spite of the fact that the sailor's home is the best reward to look forward to when the man's life-work is done. To Americanize the service and make it sufficiently attractive for our native born citizens to take it up as their career in life several propositions must be enacted into laws and put in operation; chief among which may be cited the following: 1. The possibility of enlisted men becoming commissioned officers. 2. An increase in the number of warrant officers and restriction of the appointments to this class of petty officers of the navy. 3. Increased responsibility and dignity of position conferred upon petty officers on board ship. 4. A retired list, or civil employment on shore, for enlisted men after long and faithful service. 5. More attention given to the comfort of enlisted men in the design of ships and in the administrative details of life on board them."

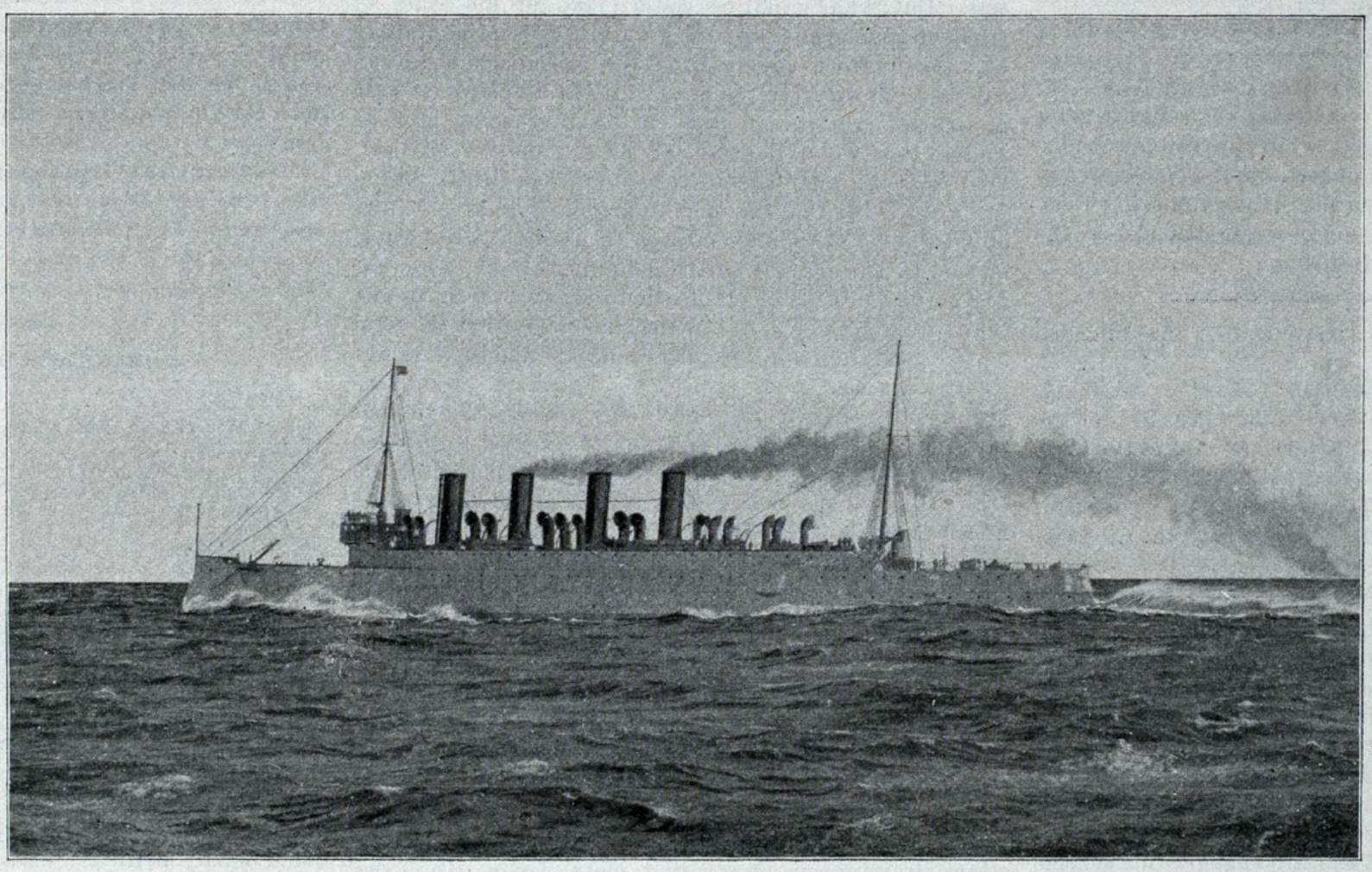
THE FASTEST CRUISER IN THE WORLD.

Greater interest has been felt in the triple-screw cruiser Columbia, from her inception to her recent remarkably successful trial, than in any other of the new ships of the United States navy, says, W. M. McFarland, U. S. N., in the *Engineering Magazine* for February. Two causes have contributed to this: she was designed to be the fastest cruiser in the world, and a radical change in the disposition of the propelling apparatus was adopted.

Naval machinery has to fulfil two very different conditions. It must be amply powerful to secure the desired maximum of speed for comparatively short periods —twelve to twenty hours—and it should work with fair economy at ordinary cruising speeds, which nowadays are about half the maximum, corresponding to about an eighth or a tenth of the maximum power. The comparatively small size of naval vessels will not permit either the space or the weight of the merchantman for maximum power, so that recourse is had to forced draft for the boilers, high speeds for the engines, and careful selection of materials with reduced factors of safety. This gives smaller engines and boilers, but they are not so economical.

Notwithstanding this reduction of size, the machinery is still enormously too large for economy at low speeds. In the New York there are two engines on each of the twin shafts, and the forward ones can be disconnected, leaving the after ones to do the work at low powers. This plan, however, requires the shafting abaft the after engine to be of the same size as for a single large engine, and it has the disadvantage of doubling the number of parts of the engines and requiring about twice the space and number of attendants necessary when there is only a single engine on the shaft.

Careful study of all the conditions led Engineer-in-Chief Melville to decide upon the use of triple screws. The two features which had greatest weight in deciding the adoption of triple screws were the greater economy of using a single engine at low powers, and the reduction in size of parts as compared with twin-screw engines. When a single engine is used the other two shafts are disconnected as far aft as possible and the idle propellers allowed to revolve freely. It requires the expenditure of some power to drag these screws through the water, but this is much less than might be supposed by those who have not investigated the subject, and is much more than offset by the increased economy of one engine of moderate size as compared with two large ones.



UNITED STATES TRIPLE-SCREW CRUISER "COLUMBIA" AT FULL SPEED.

The Columbia is a protected cruiser, which means practically that she has no side armor, the protection of magazines and machinery being by an armor-deck. This consists of inclined portions at the sides, running from about 4½ feet below the water-line at the sides to about a foot above where they join the horizontal central portion. The inclination is about 30 degrees. The inclined sides are four inches thick and the central part about 2½ inches.

The battery consists of four 6-inch breech-loading rifles, eight 4-inch rapid-firing breech-loaders, eighteen machine guns and six torpedo-tubes. Where the 4-inch and machine guns are placed the ship's side will be armored with 4-inch and 2-inch plates, respectively. The 6-inch guns will be protected by heavy shields attached to the carriages.

For the preservation of the stability by keeping the water-line intact, there is a cofferdam or compartment next to the skin on each side above the protective deck, five feet in width and about seven feet deep, extending the length of the ship. This will be packed with cellulose, which is a water-excluding material. When a shot passes through this it closes and reduces the ingress of water to an inappreciable amount. As the function of the Columbia is to act as a commerce destroyer, she has been so designed as to bear some resemblance to a merchant vessel, thus enabling her to get within range before her true character is discovered. She is about 412 feet long, 58 feet beam, 22.5 feet mean draught, and has a displacement of about 7,400 tons at that draught.

The engines resemble those of fast passenger steamers in being vertical, but have a shorter stroke and run much faster. They are of the now common triple-expansion type. As already explained, each engine, consisting of three cylinders, drives a separate screw. The cylinders are 42, 59 and 92 inches in diameter, each having a 42-inch stroke. The engines are arranged so as to bring the starting gears as near together as possible, although each engine is in a separate water-tight compartment, and this places the high pressure cylinders of the two forward engines, which drive the side propellers, aft, and that of the after engine forward. The main engines do nothing but drive the screws, all the pumps being independent and driven by special engines. In addition to contributing to smoother working of the main engines, this arrangement has such special advantages in their rapid handling that it is now universal for war vessels.

There are eight large and two small boilers, the latter being intended for use as auxiliaries when the vessel is in port. Six of the large boilers are 15 feet 9 inches in diameter, and two 15 feet 3 inches, all being 18 feet long. They are fired from both ends, each end having four corrugated furnaces 39 inches in internal diameter and about 6½ feet long. The total grate surface is 1,344, and the total heating surface 43,264 square feet. When these boilers were designed they were among the largest in the world, although those of the Campania are 18 feet in diameter. The plates forming the shells of the large boilers are nearly 1½ inches thick and the seams are treble riveted, the longitudinal joints having a strength of about 80 per cent. of the solid plate. The auxiliary boilers are single-ended, 10 feet diameter and 8½ feet long, each having two furnaces.

Profiting by the French experiments, the screw propellers have been placed in the relative positions giving the greatest efficiency. The side propellers, instead of being nearly abreast the rudder as in twin-screw ships, are well forward of this position and distant about 15 feet from the central screw, which occupies the same place as in a vessel with a single screw. In order to avoid any deleterious effect of the race from the side screws upon the central one, the side shafts are slightly inclined outwards from a fore and aft position and the central shaft is inclined downwards, with the effect that, on an athwartship plane, the projections of the bounding circles of the screws come clear of each other and the side screws are about four feet higher than the central one. All the screws are three-bladed and have the same pitch, 21 5 feet. The side screws are 15 and the central one 14 feet in diameter. As in all modern screws, the blades are bolted on and adjustable so that the pitch may be altered if, on trial, the first setting is not the best.

On the official trial the Columbia maintained an average speed of 22.8 knots, equal to about 26¼ statute miles. The steam pressure in the boilers was 147 pounds and the revolutions of the screws 134, 127.7 and 132.9 per minute for the starboard, central and port screws, respectively. The temperature in the engine rooms averaged 85° and in the fire rooms 106°. The horse power of the main engines and auxiliaries was 18,500.

The Columbia's speed of 22.8 knots per hour for four hours is the highest accurate speed for such a period ever attained by any large vessel, but it may be mentioned that the speed was also measured by two "patent logs" of the best type, and the mean of their readings gave a speed of 24.34 knots. Patent logs do not give accurate results, but the record still has a value because the speeds of British war vessels, with which our own are constantly compared, are obtained in that way, so that in such comparisons the Columbia's speed should be taken as 24.34 knots. This figure is far about the similar record of any other large vessel.

A comparison is naturally invited between the performance of the Columbia and that of the fast transatlantic liners, and statements have appeared attempting to discredit her in advance of her trial because her sea speed had been guaranteed at 21 knots, while the Campania and Lucania are credited with over 22 knots, the latter being given a record of 22½ knots for twenty-five hours. Inasmuch as the Columbia has a real speed of 22.8 knots at sea, she has beaten the Lucania, and the sea was not a mill pond by any means, as the trial was made on the day after a heavy blow. There is, however, a very important point to be noticed in connection with the Lucania's speed. The speed given her is based on her noon positions on consecutive days, with no allowance for current, which, in fact, could not be determined accurately under the circumstances. Now it is a curious fact that the phenomenal single day records of these ships are always made when coming westward, and nearly always when in the same part of the course. It is well known that on the westward run, for a distance equal to about two days' steaming, there is a favorable current, which at times is equal to a knot per hour. While the Lucania may not have had the benefit of the full strength of this current, she undoubtedly did profit by it, and this must be remembered when comparing her speed with the Columbia's which is the actual speed through the water without any assistance from current.

A MAMMOTH HOISTING ENGINE.

The greatest hoisting engine ever built, or probably ever contemplated, is now being constructed by Milwaukee parties. It is designed for operating a shaft on the property of the Tamarack (copper) Mining Co., whose property adjoins that of the Calumet & Hecla Co., in upper Michigan. This is one of the deepest shafts in the world, being down 9,400 feet, and the engine above referred to will be large enough to admit of its going to a depth of 6,000 feet. This hoisting engine must of necessity be of such mammoth proportions that in its construction many interesting problems arise. The drum is probably the most interesting feature about the engine. This will consist of a double cone, with the greatest diameter at the center, and tapering toward each end, the smallest diameter being 13 feet 9 inches, the greatest diameter 36 feet and the distance across the face of both cones 24½ feet. Building these cones of cast iron would probably be out of the question, and in the substitute therefor, as devised by the builders, lies the novelty of this huge winding engine. A cast iron hub will be keyed to the shaft, from which a wrought iron "spider" will be built up, and over the latter will be laid a perfectly smooth boiler iron cone made of matched plates. The grooves for the wire rope will then be put on over the cone by winding an especially rolled steel strip around and around the cone and securely fastened in such a manner as to form a perfectly even groove for the cable without the necessity of being turned off with a tool. The bending of these strips to allow for the varying diameter of the cone, the angle of the latter, and the spiral in which it must be applied, will be an interesting piece of work. The engine which will drive the huge double cone will consist of a pair, with cylinders 32 by 84 inches, with cranks at right angles. Engine shaft is 88 inches in diameter and about 38 feet long, with suitable reversing mechanism; and there will be separate cylinders to operate brakes and reversing gears, all operated from elevated platform by one man.

The weight of the drum is 175 tons, and that of the whole engine 350 tons. The speed at which this engine will hoist the cars out of the shaft will approximate a mile per minute. The magnitude of the undertaking will possibly be better understood when it is known that the 7,500 feet of 1¼-inch steel cable on each half of the drum will be about 11½ tons. Thus it will be seen that, with the car at the bottom of the shaft, the weight of the cable which will do the hoisting will be greatly in excess of the weight of the load to be elevated. There will be two cars, one ascending as the other descends.

The Marine Record,

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CLEVELAND, O., FEBRUARY 15, 1894.

THE MARINE RECORD is in receipt of several volumes of the annual report of the Chief of Engineers, which show the usual care in compilation.

THE report of the Light-House Board for the fiscal year ended June 30, 1893, is at hand. It contains the usual data and recommendations, and contains a chart of the line of thirteen electric buoys maintained on the Chicago lake front during the World's Fair.

COMMANDER OSCAR F. HEYERMAN'S unlucky star seems to follow him closely. Transferred from the lakes a few years ago under a cloud which investigation dispelled, he has again been so unfortunate as to be in command of the Kearsarge when she struck Roncador Reef. Commander Heyerman has many warm friends on the lakes who sincerely regret his mishap.

THE WESTERN IRON ORE ASSOCIATION has decided upon sending Hon. John C Covert, who recently resigned as editor in chief of the *Cleveland Leader*, to Washington, to use his best endeavors to demonstrate to the Senators the dire results of putting ore on the free list. Mr. Covert is a gentleman well qualified in all respects for the task imposed upon him, and will prove an excellent co-laborer with Hon. R. C. Parsons, who is looking after the interests of the vessel owners.

REPRESENTATIVE WISE, of Virginia, has submitted to the House of Representatives from the Committee on Interstate and Foreign Commerce a bill which should certainly meet with unanimous approval and prompt enactment. The bill extends the benefits of the marine hospitals to keepers and crews of life saving stations. The report upon which the bill seeks passage very properly states that the people whom it seeks to aid are employes of the government who are engaged in a service quite as arduous and dangerous as that of seamen not employes of the government, who are carefully tended in these hospitals. Justice as well as humanity seems to demand that the life savers be given the same privileges.

THE Dominion government has turned a deaf ear to the entreaties of its lake interests and has authorized the statement that the tolls will be the same as last year, viz. 10 cents per ton on wheat and Indian corn, peas, barley, rye, oats, flaxseed and buckwheat passing through the Welland canal and St. Lawrence canals, respectively, the payment of the toll for passing through the Welland canal entitling the products to free passage through the St. Lawrence canals. This last clause shows that the discriminating policy of the Dominion has not been abandoned, but only gave place in 1892 to the force of circumstances. It also indicates what may be expected when the canal on the Canadian side of the St. Mary's river is completed.

ACCORDING to the iron papers, prices on soft steel have advanced from fifty to seventy-five cents over the low water mark. Never has structural material for steel ships and boilers been so cheap in America, and the ships of three thousand tons now building will be finished at a cost of $25,000 less than ever before. A lake shipbuilder recently bought boiler steel at exactly the same price it would have cost him in England. This great drop in price has nearly all come from the reduced scale of wages paid to labor in this industry, as a result of the promised tariff reform. Thus does free trade cast its shadow before. The slight advance just noted only means that the mills are in many instances thronged with orders from people who have been desiring to take advantage of panic prices.

A TARIFF REFORM SPEECH.

While we have not seen any denial from Capt. Alex McDougall regarding the published statements attributed to him as being made before the House Committee on Rivers and Harbors, yet it is hardly credible that he should put forth the arguments which he is quoted as having made use of. The published statement credits Capt. McDougall with remarks which would do more damage to the cause of protected iron ore than all the work done by his free trade fellow townsman, Major Baldwin, who has become a martyr to his principles, and who has been abused to an unwarranted extent merely for being consistent. The published accounts say:

"Speaking of the cost of lake transportation, particularly in his whale-backs, in which members of the committee seemed very much interested, Capt. McDougall said he could carry a ton of freight 1,000 miles for less than a quarter of the cost of rail transportation. The committee interpolated some questions relative to iron ore and received in reply a complete history of the opening and development of the various Lake Superior ranges. In this connection Capt. McDougall said that he could carry a ton of ore to market for about 40 cents and the cost of loading and unloading would be as much more, or a total of about 80 cents. He illustrated the cost of carrying freight by saying that he could move a ton of freight a mile with the consumption of a third of an ounce of coal if the convoy of barges was a reasonably large one. He said that the Mesaba range iron could be brought to water for from 50 to 75 cents a ton cheaper than the ore from any of the other mines, and predicted that this range would control the iron product of the Northwest."

Now, it is strongly characteristic, and perhaps very praiseworthy in Capt. McDougall to laud to the skies the type of lake vessel in which he has large financial interests. But what profit he could make for his boats, or those of anyone else, by telling a tariff reform committee of a tariff reform congress that his whaleback boats can carry ore down from the head of Lake Superior at such figures, no mortal man can tell. And granting that he said all this, which is extremely hard to believe, it is evident that the members of the committee, while taking his word for it that the mere transportation of ore costs only forty cents, would continue to use their own information to the effect that the handling of ore does not cost forty cents, as he claims, but only twenty cents, and they would at once arrive at the conclusion that the total cost of carrying iron ore, including the handling, is but sixty cents per gross ton. This conclusion would be argument enough to convince many a congressman that not only did iron ore and the lake commerce require no especial protection, but that ore should be placed on the free list as a blow to a monopoly. It is sincerely to be hoped that Capt. McDougall will take pains to see that any misquotations from his argument in favor of harbor improvements be not turned to advantage by members of Congress who favor the passage of the Wilson bill.

THE BRITISH LLOYDS.

IF the domestic insurance companies wish to keep the Inland Lloyds as the lake register, they will have to reconcile all elements, for they are again to suffer an inroad upon their territory from a large classification society. This is no less than the British Lloyds, which states its intention of classing metal boats. Inquiries from local builders and owners fail to develop that any bid for patronage is being made, but Mr. A. J. Dryhurst, secretary of the Lloyds Register of British and Foreign Shipping, writes as follows, under date of January 29, 1894, from the offices at No. 2 White Lion Court, E. C.:

"The question of including in the register book of this society vessels navigating the inland waters of North America has received consideration, and the next edition of the book will include all iron and steel vessels of more than one hundred tons engaged in this trade. It is considered that to go further than this would unduly increase the bulk of the register book without advantage to the general body of subscribers."

The growing interest which the foreign companies are giving to the modern lake boats is certainly a compliment, as all will realize who are familiar with the high standard demanded under their rules, and the equally high classification given the lake craft under these rules. The taking up of lake tonnage by the British Lloyds will probably lead to further advances by other societies of the same nature.

MAY VISIT THE LAKES.

President Cleveland and his entire cabinet may visit the head of the lakes next summer. He has been invited to do so by Capt. McDougall, of West Superior, and President J. J. Hill, of St. Paul. A number of senators and representatives are also invited to make the trip. President Hill has offered the use of his new passenger steamer North West, for the distinguished party from Lake Erie to West Superior. They would return via St. Paul, Minneapolis and Milwaukee. The step is taken in the interest of a deep channel to the sea, and the harbor deepening project of the head of the lakes. The President has expressed a willingness to make the trip, which would take him ten days or two weeks.

OBITUARY.

Capt. Christopher B. Goulder, one of the pioneers of lake navigation, passed away last Friday, after a prolonged illness, at the home of a son, No. 383 Kennard street, Cleveland, aged 81 years. Capt. Goulder was a lake master early in the thirties, and was one of the first to navigate Lake Superior, the boat being taken to pieces below the St. Mary's river, carried overland and put together again above. Capt. Goulder retired about twenty years ago, after a long career on the water, having shipped when quite young, and traveled all over the world. Capt. Goulder was the father of Mr. Harvey D. Goulder, one of the lake's best admiralty lawyers.

Capt. Goulder's funeral occurred Sunday afternoon, a large number of friends attesting their respect by their presence. The services were conducted by Rev. Charles Townsend, of the Woodland Avenue Presbyterian Church, assisted by Chaplain J. D. Jones, of the Floating Bethel Society. Among the floral tributes was a large anchor. The casket was borne to the grave in Woodland cemetery by Mr. Thomas E. Quayle, Capt. A. R. Manning, A. C. Chapman, W. C. Richardson, Capt. Thomas Fitzpatrick and Capt. George Warner, the two last named having sailed with Capt. Goulder over half a century ago.

* * *

Capt. William Carlisle, who last spring fitted out and sailed the steamer Yuma, of the Wilson line, died of pneumonia at his home in Brooklyn Village, O., Sunday morning at 3 o'clock. Capt. Carlisle was born in Glasgow, Scotland, fifty-two years ago, and came to Cleveland in 1851, and has been sailing the lakes ever since. He was a man who was honored in his profession and for his personal character. He left a widow and three children. His funeral took place from his late residence No. 96 Greenwood street, Brooklyn, Tuesday afternoon, being attended by a large representation from the Ship Masters' Association and from Bigelow lodge of Masons. The remains were placed in a vault at Riverside, the Masons conducting the services at the cemetery. The pall bearers were Capt. Edward Morton, Capt. W. S. Mack, John Thompson, Joseph Farrel, of Buffalo, and two members of Bigelow lodge.

WHALEBACK WAR VESSELS.

The idea of using the whaleback form of vessel for war purposes is not new. It has been one of Capt. McDougall's hobbies since the first whaleback freighter was placed in successful operation, though the plan has never been formally laid before the Washington officials before now. The plan is to construct one or more merchant vessels of the whaleback design and equip them with warship armor, guns, etc.; these vessels to ply on the lakes as common freighters, under subsidy of the government. Under a treaty of the United States with Canada, this government can maintain only a limited number of warships on the inland lakes. The number, it is claimed, is entirely inadequate to the protection of the United States in the event of a serious outbreak. If merchant vessels could be equipped with naval appliances, as the inventor has outlined, the government could easily maintain a number of warships at a very moderate cost. Capt. McDougall has also placed before the authorities the superior qualities of the whaleback as a torpedo boat. Exactly what will come of the negotiations is not clear, but it is thought that the Naval Department will take hold of the plan and use it, if not in toto, in some modified form. The dimensions of the boat would be: length, 262 feet; width of beam, 38 feet; depth of hold, 25 feet. Such a boat could easily pass through the St. Lawrence river, and ply between Superior and Liverpool as easily as between inland lake ports. These dimensions contemplate the deepening of the vessel channel from the head of the lake east. The committee which has the matter in charge consists of Lieutenant Commander Sperry, Constructor Hibbs and Engineer White. Capt. McDougall will meet this committee this week.

MUST SHOW STERN LIGHTS.

The supervising inspector-general of steam vessels, Gen. James A. Dumont, has just issued a circular letter embodying the action of the Board of Supervising Inspectors on the subject of lights on ferry boats, barges and canal boats when in tow, which was recently outlined in these dispatches. The new regulations legalize the system of lights that has prevailed for many years in the different localities, with this restriction, that "hereafter, when the red and green side-lights are carried on the Atlantic coast waters or Great Lakes, the last boat in the tow, on being overtaken by another vessel, shall show from her stern to such last-mentioned vessel a flare-up light, or, in lieu thereof, a white light fixed and carried in a lantern, which shall be so constructed and secured that it shall throw an unobstructed light over an area of the horizon twelve points of the compass."

WRECK OF THE KEARSARGE.

The old U. S. S. Kearsarge struck on Roncador Reef, about 200 miles from the Mosquito coast of Central America, on February 20, which proves to have so badly damaged her as to make her a total wreck, so far as the service of the United States is concerned. She was abandoned last Saturday with the stars and stripes still flying at her peak.

The Kearsarge sailed from Port-au-Prince, Hayti, on January 30, for Bluefields, Nicaraugua, to protect American interests there in view of the invasion of the military forces of Honduras. She was wrecked three days out. Admiral Stanton was on the Kearsarge. When the New York and Detroit were despatched to Rio, it was made the flagship of the North Atlantic squadron, and Admiral Stanton, after the Secretary of the Navy had acted on his report of the salute of Mello in Rio bay, was ordered to proceed to Port-au-Prince and transfer his flag to the Kearsarge and assume command of the station. The officers aboard the Kearsarge were Rear Admiral Oscar F. Stanton, Commanding Officer Oscar F. Heyerman, Lieuts. Charles F. Forse, Charles H. Lymon, Burns T. Walling, Lieuts. (junior grade) John Hood and Frederick R. Brainard. The crew was composed of 200 sailors and marines. She left the Brooklyn navy yard on December 31st.

The Kearsarge was under both sail and steam at the time, and was going about ten knots when she struck. A heavy sea was running, and as the character of the cays in these waters was well known to the Kearsarge's officers, it was evident that safety lay in forcing her as far up on the cay as possible, before she began to break up. Accordingly, she was at once lightened by having her guns thrown overboard. One of the first to go was her splendid old 11-inch after pivot, the gun that did such terrible execution on the Alabama in their famous fight in 1864. Next the masts were cut away, not only to lighten her, but also to provide material for constructing rafts.

On Saturday morning, February 3, a line was got ashore, and all hands were finally landed safely on the cay. Only one man was drowned, a fireman named Anderson Robbins.

The Kearsarge was built at the Portsmouth navy yard N. H., in 1861. On June 4, 1861, she was ordered to be called the Kearsage, which was changed to Kearsarge on June 15th. The former spelling may account for the wrong pronunciation so often heard from other sailors. Her dimensions were as follows: Length over all, 232 feet; keel, 198½ feet; beam, 33 feet; depth, 16½ feet; engines horse-power, 1,400, tonnage 1,031. The greatest day in the history of the Kearsarge was June 19, 1864, when she fought and conquered the rebel ship Alabama.

Roncador reef is a little over 200 miles from the Mosquito coast of Central America. Between the coast and the reef lies Old Providence Island, only 75 or 80 miles to leeward of the reef. The reef is well known to mariners in those waters as a dangerous impediment to navigation. Efforts have been recently made to secure the erection of a lighthouse on this point. Some time ago, when Warner Miller and officers of the Nicaragua Canal Co. were on their way to Nicaragua, they were wrecked on this same point.

RICHELIEU AND ONTARIO ANNUAL.

The annual meeting of the shareholders and directors of the Richelieu and Ontario Navigation Co., was held in Montreal last Thursday, the 8th inst. Mr. Michael Connolly, who has proved himself a splendid executive head during the few months of his acting presidency was unanimously elected president, and dispatches received from the friends of the company east and west go to show that the choice meets with entire approval all round. The election of directors resulted in Messrs. Michael Connolly, L. J. Forget, John Lewis, A. F. Clerk, Fred Henshaw, Hector Mackenzie, R. Forget, W. Wainright, J. Swift and W. R. Miller being chosen. As soon as Mr. Nicholas Connolly is again in a position to resume his duties on the board, one of the directors chosen last Thursday will be replaced by the ex-president of the company, and it may be that one more change will be announced at the same time. The retirement of Mr. Thomas McGreevy is probably permanent. The stock of the R. & O. Company embraces 13,500 shares, and no less than 12,000 shares, if not a little over, are in the hands of the present directorate.

The following is a list of the principal shareholders in the company: Banks—British North America, 1,400 shares; Quebec, 1,300; Jacques Cartier, 1,185; Commerce, 1,265; Burnett & Co., stock brokers, 519; L. J. Forget, 50; Rudolph Forget, 50; J. B. Murphy, Kingston, 1,000; N. K. Connolly, 500; M. Connolly, 50; James Swift, 50; M. H. Folger, 50; Joe Louis, 112; W. R. Miller, 50; Alton F. Clerk, 50; W. Wainwright, 50; Mrs. Wainwright, 50; Col. Henshaw, 200; J. Johnston, Kingston, 300; H. Mackenzie, 50; estate J. G. Mackenzie, 170; W. J. Murray, 50; estate Murray, 115; estate R. French, 100; Gen. A. G. Warren, London, England, 84; N. Marler, 25; W. J. Turpin, 50; Misses Hopkins, London, Eng., 57.

Mr. William Wainwright was re-elected vice-president, and it is rumored that a new general manager is to be found, and, it may be, a high-priced one at that. Mr. M. Connolly, the new president, says that the company has never been in as good a position to serve the public as to-day.

BRITISH SHIP BUILDING.

The following table shows the vessels (war ships excluded) now under construction in the United Kingdom and the countries for which they are being built:

COUNTRY FOR WHICH INTENDED	NO	STEAM TONNAGE	NO	SAIL. TONNAGE	NO	TOTAL TONNAGE.
United Kingd.	207	470,061	39	48,134	246	518,195
Brit. Colonies.	2	1,250	2	545	4	1,795
Austria.....	2	4 530	..	.....	2	4,530
Belgium.....	...	.....	..	.....	...	.....
Denmark.....	...	.....	..	.....	...	.....
France.....	2	1,582	..	.....	2	1,582
Germany.....	7	22,590	..	.....	7	22,590
Greece.....	...	.....	..	.....	...	.....
Holland.....	1	3,730	..	.....	1	3,730
Norway	4	8,120	..	.....	4	8,120
Russia.....	6	12,630	..	.....	6	12,630
South America	3	1,138	..	.....	3	1,138
Spain.....	3	3,995	..	.....	3	3,995
Turkey.....	2	488	..	.....	2	488
U. S. America.	2	1,754	..	.....	2	1,754
For sale or nationolity of owners not stated.....	28	46,158	23	15,276	51	61,434
Total.....	269	578,026	64	63,955	333	641,981

The present returns of steamers under construction exceed those of the previous quarter by about 45,000 tons, while a decrease of about 20,000 tons is noticeable in the returns of sailing vessels.

TESTS OF ARMOR PLATES.

The Carnegie Steel Co. had better luck with its armor plate yesterday than at Indian Head a few weeks ago. That plate cracked badly, and the company was given another test, also at the Indian Head proving grounds. The government, however, has the right to demand still another test before it accepts the 300 tons of nickel steel armor involved in the test. The plate tested is part of the 11½ inch barbette armor of the battleship Monadnock, and is of curved formation. There was first fired at it a $250-pound solid shot of hard cast steel. An 8-inch rifle, and 12½ pounds of powder was used. Success depended upon whether or not the plate would crack. The projectile penetrated 12¼ inches, including the armor and plank backing, and then rebounding, split into three pieces. A load of 98½ pounds of powder and a 250-pound shot was then fired, this test being for penetration, and the plate coming up to standard if the plate was not cracked and the shot did not go through plate and backing. The shot penetrated the steel plates but imbedded itself in the backing, so this test was likewise considered successful.

TALK ABOUT NEW TONNAGE.

A report has floated in that the Goodrich Transportation Co. have decided to build another new passenger steamer like the Virginia, and that the contract would go to Cleveland or Detroit parties. None of the Cleveland shipbuilders know anything about such a contract. It is stated that the new steamer was decided upon at the Goodrich Co.'s annual meeting last Tuesday, and that the new steamer will have a steel hull and twin screws, and will have an interior as palatial as the Virginia. She will be out by the opening of the season of 1895, and will take the place of the Indiana between Milwaukee and Chicago, the Indiana being put on one of the northern runs. Later reports from other quarters are, however, to the effect that the project has been abandoned, or at least postponed for a year.

Bids have been put in by F. W. Wheeler & Co., of Bay City, for salt water work to the amount of over $2,000,000. Just what will be the result will not be definitely known until the latter part of the month, but sufficient is known to warrant the prediction that before spring is fairly opened keels will be laid in the Wheeler yards for six ocean steamers, averaging 332 feet in length, a majority of which will be three-deckers.

THE CORSICA-CORSICAN COLLISION.

To the Editor of The Marine Record:

The Vessel Owners' and Vessel Masters' Association, at a meeting held on the 6th inst., resolved that Charles Westcott, Supervising Inspector, Detroit, be asked, through the columns of THE MARINE RECORD whether any, and, if not, why has not any official enquiry been made into the matter of the collision between the steamer Corsica and the schooner Corsican on Lake Huron in June last when the schooner was sunk and all hands, seven in number, perished.

THOMAS CLARK,
President V. O. & M. A.,
No. 252 S. Water St.

Chicago, Feb. 13, 1894.

NOTES OF THE MINES.

During the past few days the Metropolitan Land & Iron Co. increased the force at its mines by the addition of 100 men, at Ironwood. The company now has 700 men at work.

A vein of rich iron ore has been located near Brule, Wis. It is thought to be an out-cropping of a formation which lies along the south shore of Lake Superior and touches the surface at Iron River and other points.

The large planing mill and carpenter shop owned by the Calumet & Hecla Mining Co. was completely destroyed by fire about 10 o'clock last Friday night. The loss on stock, machinery and buildings amounts to about $80,000.

One of two things will happen within the next three weeks: Either orders will be received to prepare for an early resumption of operations at the Chapin or the pumps will be pulled and the mine permitted to fill with water.—*Iron Mountain Range Tribune.*

The men set to work the latter part of last month at the Cleveland Hematite quit Friday night because of the low wages they have been earning. There were ninety men employed in the mine—seventy-five underground and fifteen on surface.

Mining operations at the Florence were suspended on January 15th, with 210,000 tons of ore in stock. For the present it is the intention to keep the water at the seventh level, and should there be no improvement in the ore market during the next 60 or 90 days, it is likely the pumps will be lifted and things put in condition for an indefinite period of idleness.

The Aragon is now giving employment to 290 men. While the scale of wages is low, the cash is paid every two weeks, and those who receive it are thus enabled to purchase at the lowest cash prices. The importance of continued operations at the Aragon, even at reduced force and wages, can be measured only by comparing with conditions existing in other parts of the peninsula.

The drift from the 70-foot level of the new shaft at the Ames struck ore yesterday at a distance of seventy-five feet from the shaft. The ore is identical in quality and appearance with that found on the level above, and the foot-wall shows the same incline and characteristics as at the point referred to. This is encouraging and indicates that the Ames will prove an important addition to the shipping mines of this city. The ore is of excellent quality, being a hematite of Bessemer kind and is already smelted in furnace.—*Iron Ore.*

Work at the new, or No. 2, Queen shaft of the Buffalo mine will be resumed as soon as the machinery can be put in repair and a number of other improvements, including a new skip-road, are completed. The shaft is down seventy-five feet, thirty-five feet of that depth in ore. It is the intention of the management to develop the workings of the new shaft after the machinery is in place, and as soon as everything is in shape for hoisting, a few men—perhaps fifteen or twenty—will be taken on. The work undertaken will be done in a quiet way.

The Appleton is still employing seventy-five men, while the Loretto has a somewhat larger force. There has been much speculating as to the future of the Appleton, but so far the directors have not made known their future policy. It is said that the mine has improved much during the past few weeks, and it is hoped that the operators will find encouragement enough in this improved condition to warrant a continuance of work. The Loretto is probably paying its way, and perhaps doing a little better, while there is every reason to hope that the opening work now being done will add much to the amount of ore in sight.—*Current.*

The hoisting engine at the Salisbury that was moved into the new engine house lately, was started up Tuesday. The boiler was put on at once and the pump stopped. The bailer is four feet in diameter by fourteen feet long, and holds 1,354 gallons, or 5½ tons of water. The mine is 860 feet deep and to keep the water out the bailer is run from ten to twelve hours out of the twenty-four, and pulls up during this time from 800 to 1,000 tons of water. While in operation it averages a trip every four minutes, or 340 gallons per minute. It will take several weeks to move the large pumping engine over onto the new foundation. The ground where the machinery before stood is still slowly going down.

A late Bessemer dispatch says: "The Eureka, owned and operated by Corrigan, Ives & Co., has shut down and the property will fill with water. The Eureka was the only mine tributary to Bessemer that moved a pick underground for the last four months. A year ago to-day a man to do small jobs like sawing wood could scarcely be found at any reasonable price, and the townspeople felt accommodated if a man could be gotten for $1.75 per day for such work. To-day the books of the city show over 1,038 people receiving public aid, while in this thinly populated county the reports show over 6,000 people receiving public aid. Nearly one-half of the population of the county is on this list and the other half will be there before three months."

A PROJECTED TUBULAR RAILWAY.

There is at the present moment a question of a new project having for its object the connection of the European continent with England by railway. It is proposed by Sir Edward Reed, a member of the English Parliament and engineer-in-chief of the Admiralty. His project consists in the establishment, under water, of one or more metallic tubes capable of giving passage to a railway, and thus avoiding the principal objections that his predecessors have encountered. The idea seems to be meeting with favor in England and a large number of members of Parliament, hostile to all other projects, have pronounced themselves partisans of the tube.

Sir Edward Reed gives as the *raison d'etre* of his project the configuration of the bottom of the strait, which, at the place selected, presents a relatively plane surface, or, at all events, exceedingly gentle slopes. The tubular line would start from a point of the French coast situated to the south of Cape Gris-Nez, would pass to the northeast of the shelf of the Varne, which it would entirely avoid, and would end at the English coast between Folkestone and Dover, to connect with the Southeastern and London-Chatham-Dover lines. In following this general direction the bottom is found at depths much less than might be expected. The greatest depths are found at about a third of the distance between France and England, where they reach 185 feet. The greatest difference of level between any two of sixteen consecutive soundings a mile apart on the direction line is about 39 feet, which for a length of a nautical mile corresponds to a slope of scarcely eight-hundredths of an inch to the foot.

Sir Edward proposes the adoption of a double walled tube of iron or steel plate. The annular space would be strengthened by a series of longitudinal I girders, and then filled in with beton of Portland cement. Such a tube under conditions of resistance easy to determine by calculation would be perfectly tight and offer guarantees of almost indefinite duration. As for the putting of it in place that is a subject that has received special study, and the method proposed forms the most original part of the project. It is proposed to construct the tube in sections of 300 feet, each of which would be hermetically closed at the two ends, so as to be capable of floating and of being towed to the place of submersion. It would be attached by one of its extremities to a huge caisson designed to form at the bottom of the water a very low pier for its support. It is clear that if we have a floating tube and that by any means whatever we force one of its extremities to descend to the bottom of the water, the other extremity will emerge, the tube as a whole taking an inclined direction. That is precisely what occurs here. The tubular section is brought near the emerging extremity of the section that preceded it. The floating caisson is attached to it by means of large hinges, and, after being properly ballasted, is made to descend to the bottom along with the second extremity of the first tube and the first of the following. The tube is thus laid at the bottom of the water section by section, each of the latter serving as a guide to the following. After the first section has been properly laid and directed there can be neither error or difficulty in putting in place all the following, which adjust themselves in a line in the prolongation of one another. As for the forming of the final joints under water, there are numerous ways of doing that.

In order to resist the transverse stresses that may occur when one of the extremities of the tubular section remains at the surface of the water, Sir Edward proposes to submerge simultaneously two tubes 70 feet distant and connected by metallic crosspieces. There would thus be obtained a sort of huge horizontal girder, of which the two tubes would form the chords and which would present sufficient rigidity to resist all the stresses due to the motion of the water. Each of these tubes would contain but one railway track, designed for the running of trains in a single direction.

Finally we have seen that the tube would be supported by very low submarine piers. It seems preferable, in fact, not to allow them to rest upon the sea bottom. There is assured in the first place a free circulation of the currents above and below, and, in the second place, the laying is greatly facilitated without recourse to submarine dredging, since it is possible to regulate the height of the piers in such a way as to avoid all unevenness and the slight changes of level of the bottom. As the tube is held at the bottom by the weight of the piers only, it is submitted to upward stresses that may be regulated at will by properly calculating its own weight. It would be possible, even, to completely annul such stresses by giving the submerged tube an ascensional force equal to the weight of a train upon a section. At all events, the projector anticipates that the tube in service will be submitted to stresses that are notably less than in any existing bridge.

As for the ventilation, that will be assured by the fact of the trains always running in the same direction in each tube. They will thus act like huge pistons, forcing the more or less vitiated air before them and sucking in a new column of pure air. There is nothing in the way, however, of having recourse to artificial ventilation, which could be easily established. Electric propulsion would naturally be employed.

According to the calculations of Sir Edward, the total cost of the tubular railway ought not to exceed 375 millions at a maximum, and the construction of it might be effected in five years. Navigation would experience no obstacle, since the tube would be at least 65 feet beneath low water at a short distance from the coasts, where it is very easy to establish beacons.

In case of war there would be numerous means of inundating the tubes immediately.—*Scientific American.*

THE NEW PLANT OF THE WM. POWELL CO., CINCINNATI, O.

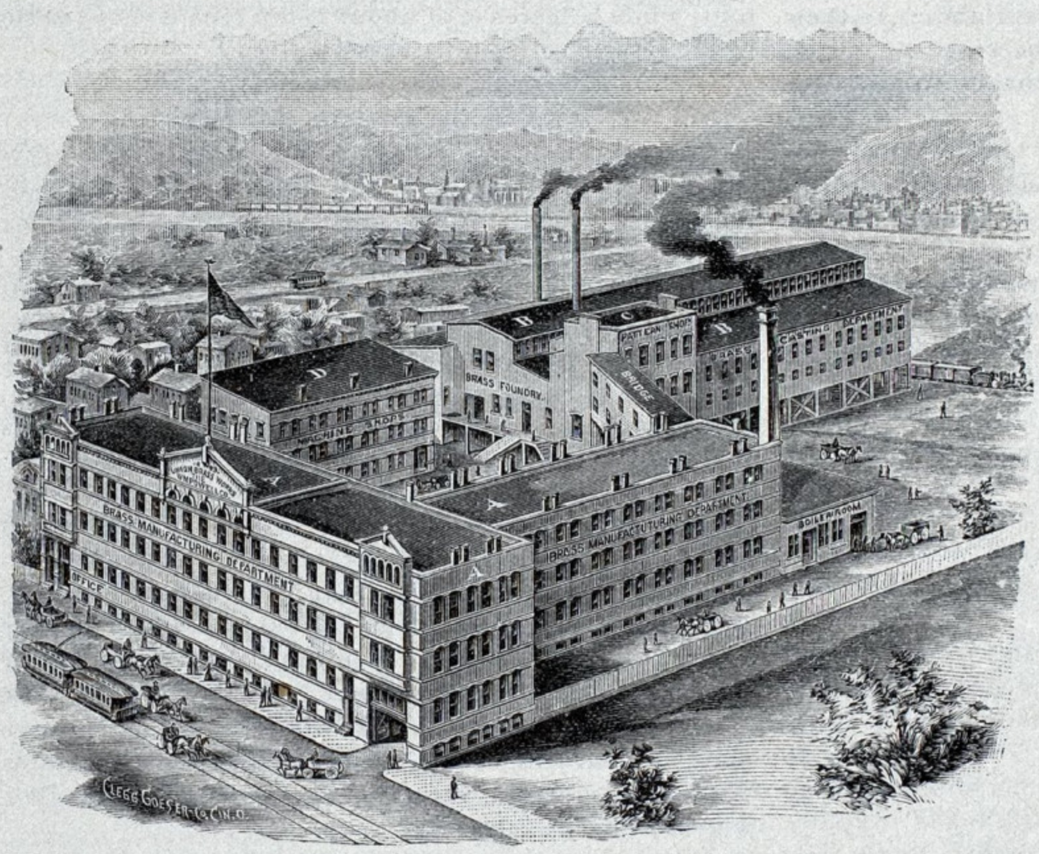
Referring to the illustration herewith representing the new Plant recently erected for the Wm. Powell Co., Cincinnati, O., which is the most complete of its kind in the country.

The works consist of a group of buildings: "A" containing the offices, warehouse and brass finishing department. The front being 119 feet and three stories high, by 175 feet long, of pressed brick trimmed with sandstone, making a very handsome and substantial appearance.

Building "B" is the foundry 60x150, and "C" the pattern house. Each building is separate and distinct, being isolated as much as possible for protection against fire.

The engine is of 150 power, Corliss type, and the boiler an upright one of their own design.

They have an 85 horse power generator which furnishes the current for five motors distributed throughout the various buildings and also for lighting 350 incandescent lights and ten arc lamps.



Their specialties; star valves, star sight feed lubricators, signal and stop feed oilers, grease cups, guard steam stops, etc, are standards of excellence and durability, and kept in stock by supply houses throughout the country.

MARINE PATENTS.

No. 513,523.—Ship's Hatch. Alexander McDougall, Duluth, Minn., assignor to the American Steel Barge Co., New York, N. Y., and West Superior, Wis. Filed Oct. 22, 1892. Serial No. 449,690. (No model).

CLAIM.—In a vessel one or more hatches therefor, provided with openings therein, for the reception of the shanks of removable rollers, whereby the said hatch may be moved to one side or the other. In a rubber packing secured to its under side, all around and adjacent to the edges thereof, and opening in said hatch between said packing and the edge of the hatch for the reception of the shanks of removable rollers.

No. 513.855.—Anchor for vessels. Ruben Zertuche, Saltillo, Mexico. Filed Feb., 27, 1893. Serial No. 463,-897. (No model).

CLAIM.—The anchor consists in a single flat metal plate, formed at one end with an integral extension, the cable having a series of branches connected with the plate, and another cable connected with the said integral extension.

No. 513,977.—Life-preserver. William S. Beale, Van Wert, Ohio. Filed Oct., 6, 1892. Serial No. 448,051. (No model).

CLAIM.—In a life preserving and swimming device, the combination with a vest or other similar body-encirculing support, of a series of hollow cylindrical pieces of bamboo, hermetically sealed at the ends and provided with cords whereby they may be connected together and also attached to the vest.

THE PATTERSON DRAFT INDICATOR.

W. R. Patterson, of Manistee, is making a tour of the lakes in the interest of the Patterson draft indicator, which is being placed on all the Inter-Ocean fleet—the steamers Metacomet, Minnesota, Massachusetts, Manhattan, Manchester and Maryland—as the result of a test given the contrivance by the steamer Merrimac. The indicator can be placed so that the officer on deck can see the signals and tell the draft of the vessel while loading. The indicator can be placed to ring signals at different drafts as the vessel goes down, and when the desired draft is reached the signal will ring until someone stops it.

In the Patterson indicator the water is conveyed through a sea cock in the bottom into a small pipe running up amidships in the boat. Thus the rise and fall of the waves does not effect the height of the water in the pipe, which always indicates the true draft.

THE SEA SERPENT ONCE MORE.

The S. S. Umfuli, owned by Messrs. Bullard, King & Co., which arrived at Natal recently, had a strange experience during the voyage out. While the vessel was about 300 miles north of Cape Verde, lat. 23° N., long. 18° W., and about half past five in the afternoon, the chief officer espied a strange looking monster swimming through the waves. The object was about 500 yards away from the ship, and presented the appearance of a huge serpent, with slimy skin, and several pairs of short fins about 20 feet apart. In circumference it measured about the same demensions as a full-sized whale, and about 80 feet of its body could be seen above water. Aided by glasses the chief officer distinctly saw the serpents mouth open and shut. The jaw appeared about 7 feet long and was armed with large teeth, the gums being of a whitish color. The serpent had the appearance of a huge conger eel both in shape and color, the skin underneath being white. A few minutes after it had been sighted Capt. Cringle happened to come on the bridge, and immediately caught sight of the monster. It was then well on the port quarter, and the captain had the ship's course altered so as to follow it up.

At the same moment the serpent headed directly towards the vessel until quite close up, and then altered its course, and was soon lost in the distance. Owing to the fading light and the uncertainity of being able to overtake the object, Capt Cringle abandoned the idea of giving chase. As the serpent turned in the water, a further large portion of its length was seen, moving with an undulating motion; and it is computed that the entire length could not have been less than 150 feet.

Another account states that by order of Capt. Cringle a six pounder was loaded and fired, but the elevation was a little too great, and the shell burst in the water about 200 yards on the other side of the fish or snake. Directly the shell exploded the sea serpent swerved and crossed the ship's bows at a tremendous rate, finally disappearing beneath the surface.—*Fairplay.*

NOTES.

THE Lunkenheimer Co., of Cincinnati, has issued a new folder descriptive of the Lunken Renewable Seat Gate Valve.

J. L. ALBERGER & SON are circulating a pamphlet concerning a new and improved method of purifying water for steam boilers.

JENKINS BROS., manufacturers of valves and packing, 71 John street, New York, have issued a fine new illustrated catalogue for 1894.

THE Engineer Appliance Co. is now located at Jamestown, N. Y., having removed thither from Buffalo. The firm is sending out new indicator catalogues.

PROPOSALS.

U. S. ENGINEER OFFICE, 34 West Congress Street, Detroit, Mich., Feb. 9, 1894. Sealed proposals for (A) Excavation within Coffer Dam; (B) Building Cribs within Coffer Dam; and (C) Mitersill Valves; for the 800-foot Lock, St. Mary's Falls Canal, will be received at this office until 2 p. m., March 12, 1894, and then publicly opened. Specifications, blank forms, and all available information will be furnished on application. O. M. POE, Col., Corps of Engineers. 7-9

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W. I. BABCOCK, Manager.
O. R. SINCLAIR, Secretary and Asst. Treas.

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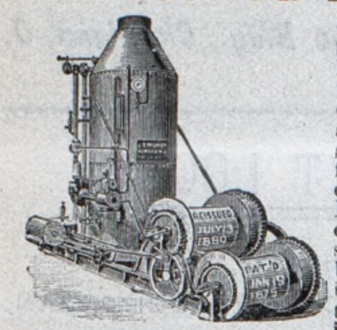

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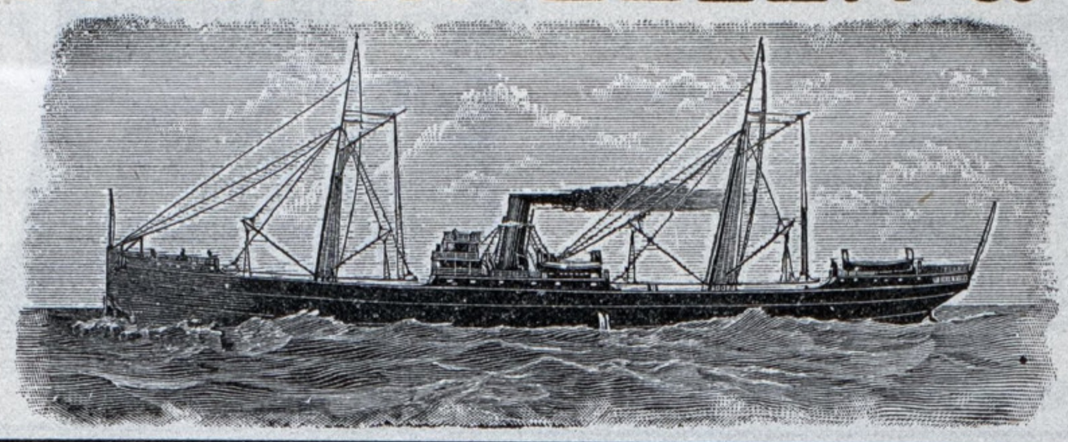

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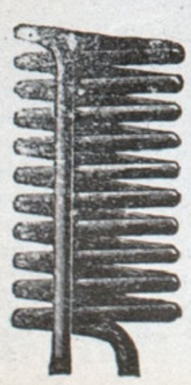

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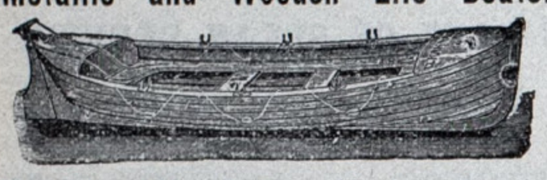

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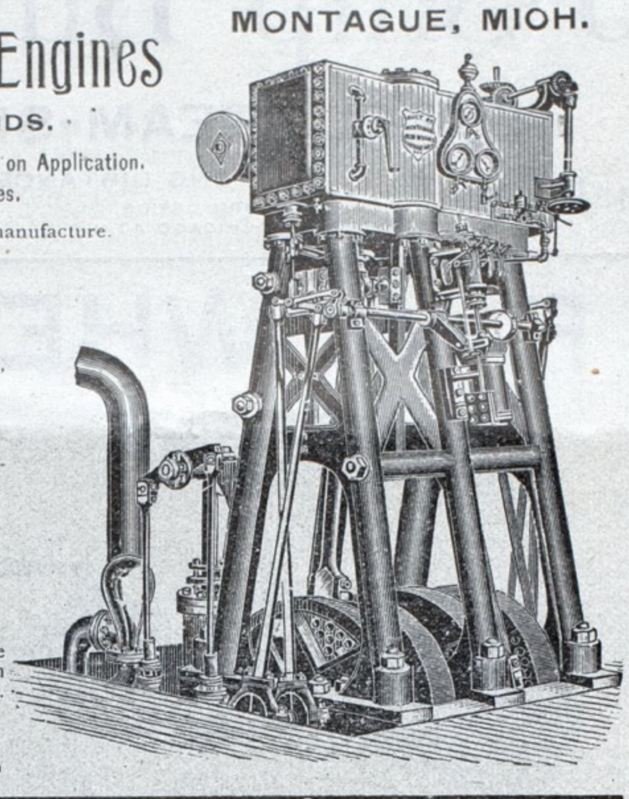

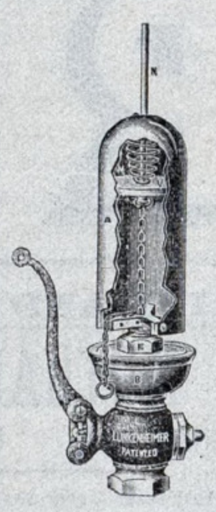

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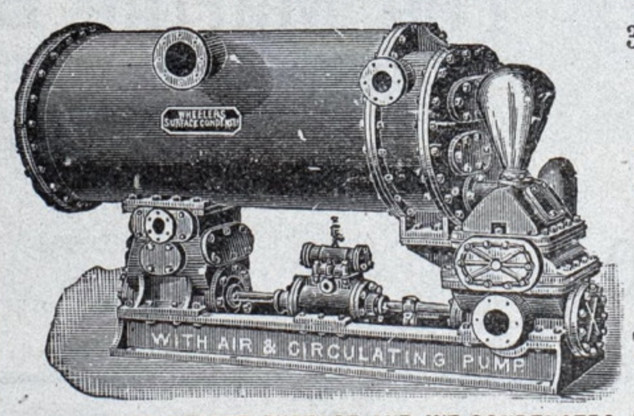

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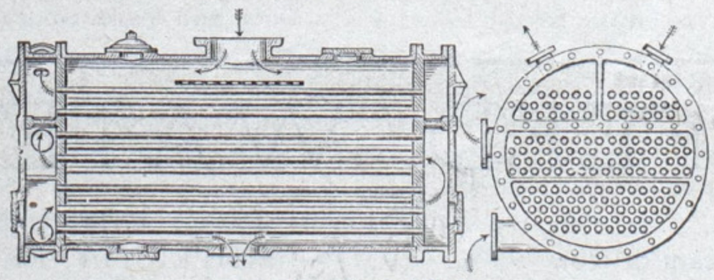

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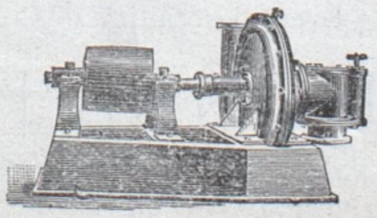

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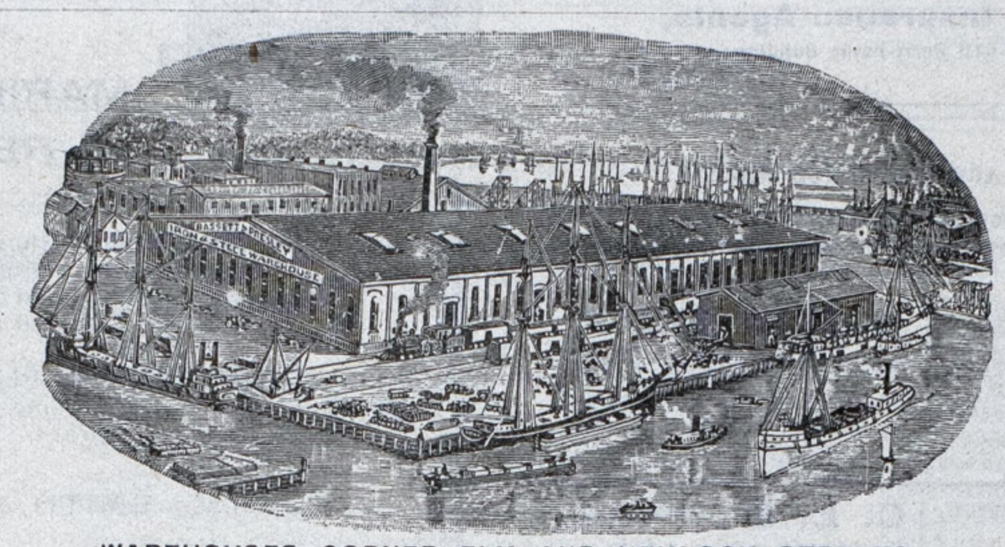

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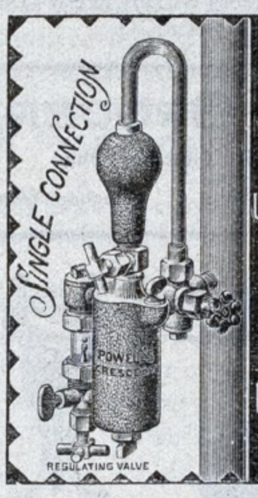

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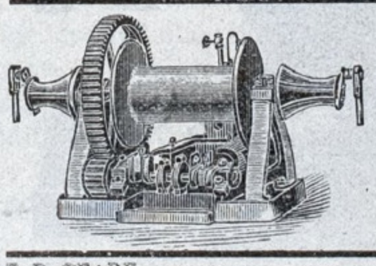

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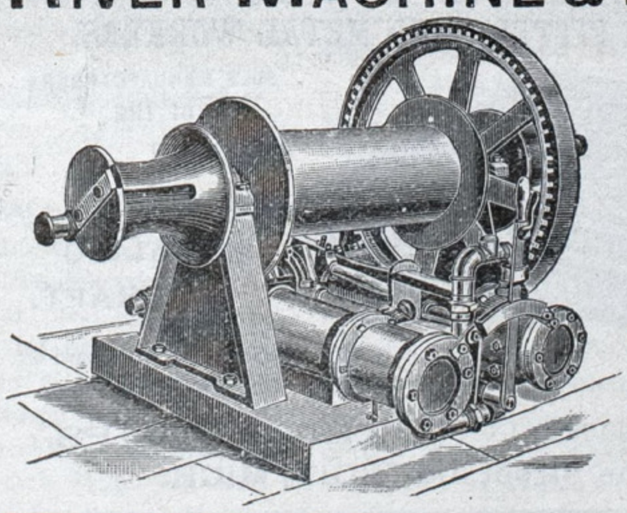

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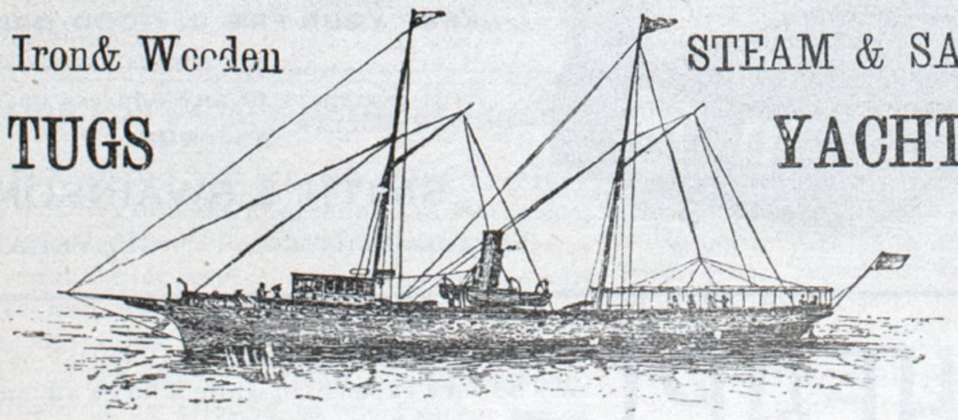

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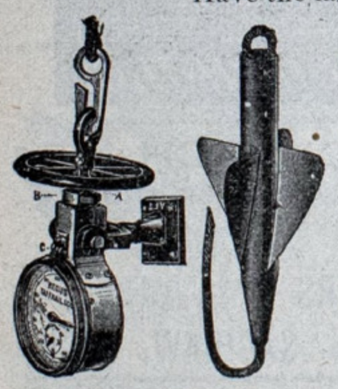

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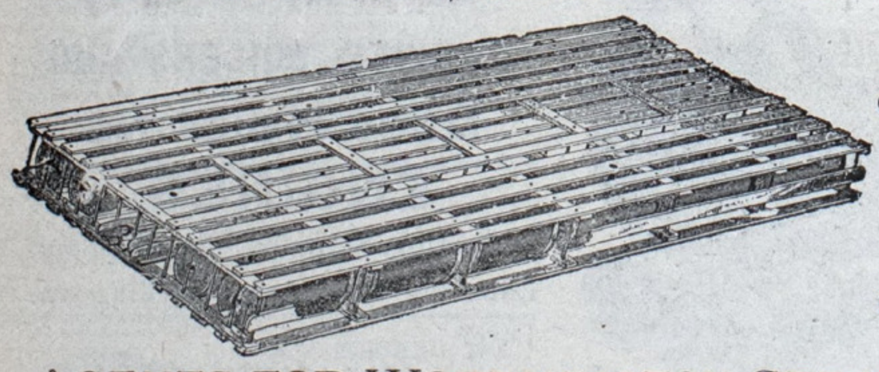

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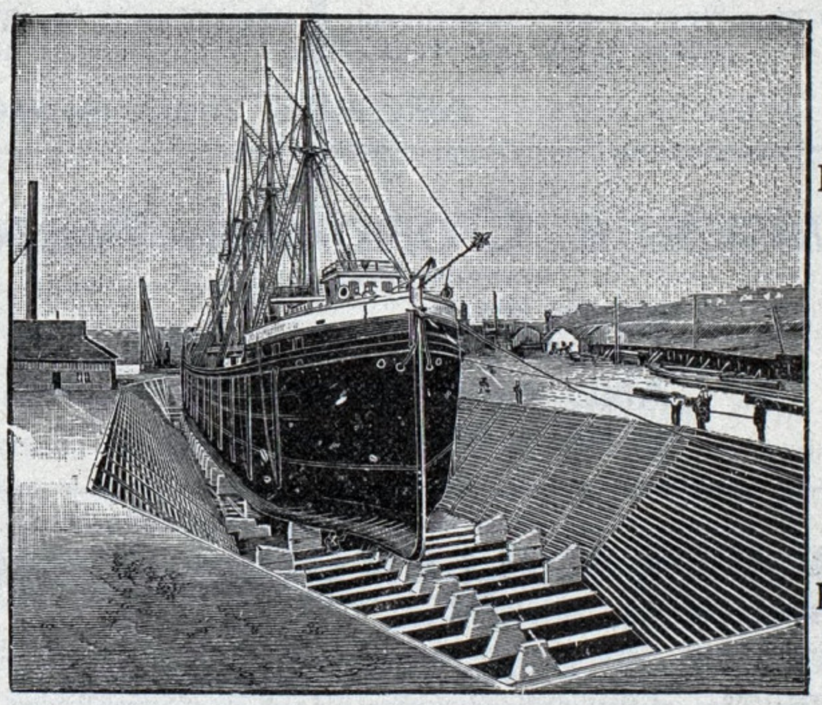

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